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# Software ergonomics for multimedia user interfaces —

## Part 2: Multimedia navigation and control

*Ergonomie des logiciels pour les interfaces utilisateur multimédias —*

*Partie 2: Navigation et contrôle multimédias*

Reference number
ISO 14915-2:2003(E)

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14915-2 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

ISO 14915 consists of the following parts, under the general title *Software ergonomics for multimedia user interfaces*:

— *Part 1: Design principles and framework*

— *Part 2: Multimedia navigation and control*

— *Part 3: Media selection and combination*

# Introduction

This part of ISO 14915 applies to both the presentation of content and interaction techniques for user control of computer-based multimedia applications in general, including stand-alone and networked-delivered applications. These applications can vary in size and complexity (e.g. a single web page, a catalogue or an interactive simulation).

This part of ISO 14915 provides specific guidance related to multimedia navigation and control that relates to the three aspects inherent in designing multimedia user interfaces identified in ISO 14915-1:

— content design;

— interaction design;

— media design.

Content design is based on the cognitive needs of the various different users and the different tasks involved in an application. Content design also takes into account various approaches to organize the content to provide support for different methods of exploring the content.

Interaction design focuses on the presentation of this content to users and the methods that will be provided to users for them to interact with this content.

Media design focuses on making use of particular media objects to implement the content and interaction designs.

This part of ISO 14915 is concerned with the navigation between, and control of, various media objects, presentation segments, and content chunks. Specific guidance on media design is provided in ISO 14915-3.

# Software ergonomics for multimedia user interfaces —

# Part 2:
# Multimedia navigation and control

## 1 Scope

This part of ISO 14915 provides recommendations and requirements for the design of multimedia user interfaces with respect to the following aspects: design of the organization of the content, navigation and media-control issues. This part of ISO 14915 is limited to the design of the organization of the content and does not deal with the design of the content in general. Design issues within a single medium (e.g. the lighting of a film sequence) are only addressed with respect to the ergonomic issues related to user controls.

This part of ISO 14915 provides

— a framework for the structuring of multimedia applications,

— information and recommendations on the design of navigation structures and navigation mechanisms for use within multimedia applications, and

— information and recommendations on the design of controls for use within multimedia applications.

It does not specifically address entertainment applications, although some recommendations can also be applicable to that domain.

ISO 14915 does not address implementation issues. The ergonomic requirements can be realised through very different mechanisms, e.g. the delivery system, a scripting language or the application.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9241-12:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 12: Presentation of information*

ISO 9241-13, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 13: User guidance*

ISO 9241-16:1999, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 16: Direct manipulation dialogues*

ISO 14915-1*, Software ergonomics for multimedia user interfaces — Part 1: Design principles and framework*

ISO/TS 16071, *Ergonomics of human-system interaction — Guidance on accessibility for human-computer interfaces*

# 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14915-1 and the following apply.

**3.1**
**content chunk**
unit of content that satisfies a requirement of a specific task for a specific user

NOTE 1 A content chunk can also meet other requirements of one or more tasks for one or more users, either by itself or in combination with other content chunks.

NOTE 2 A content chunk defines a subtopic that justifies separate consideration by the user. However, designers may decide whether or not to present one or more content chunks together within a single presentation segment.

EXAMPLE A research report is divided into five content chunks that deal with: background information, methodology, results, conclusions, and recommendations.

**3.2**
**presentation segment**
unit of design which consists of one or more content chunks which together present part of an application

EXAMPLE A Web page is used to present information about some topic.

**3.3**
**media object**
component of a multimedia application that is implemented by a single media type

EXAMPLE 1 A text object presenting a discussion about some topic.

EXAMPLE 2 An image object presenting a picture of some person.

EXAMPLE 3 A sound object presenting a song.

**3.3.1**
**composite media object**
either a single media object that is used on its own or a combination of media objects which are used together and presented synchronized with one another and/or automatically linked to one another

NOTE Some objects, such as movies, may naturally contain multiple media.

EXAMPLE 1 A moving image object and a sound object are to be played in synchronization with each other and with a single set of play, pause, and stop controls to effect the playing of both.

EXAMPLE 2 A series of songs are played one after another with a single set of play, pause, and stop controls to effect the playing of the entire series.

**3.4**
**navigation techniques**
different techniques of implementing navigation which can include: automatic, predetermined, user determined or adaptive determined

NOTE A combination of these navigation techniques can be used in different parts of a multimedia system.

**3.4.1**
**automatic navigation**
navigation where content is presented by the system without user's input

EXAMPLE Audio is presented automatically along with video.

**3.4.2**
**predetermined navigation**
navigation where the user has only one choice of where to go next, but where the user has control over when to go to this next content

EXAMPLE Upon answering question 2 in a quiz, the user is sent to question 3.

**3.4.3**
**user-determined navigation**
navigation where the user can choose which content to go to next from a number of options

EXAMPLE The user selects between going into further details in a topic and going on to the next topic.

**3.4.4**
**adaptive determined navigation**
navigation where the choices available are determined by the system based on the content and some combination of: an individual's history, an individual's personal characteristics, a group's social history, and/or a group's characteristics

EXAMPLE The system limits the choices presented based on a profile of the user's interests.

**3.5**
**content structure**
⟨multimedia applications⟩ composed of a number of content chunks that are related together in one or more logical manners

**3.6**
**navigation structure**
⟨multimedia application⟩ composed of a number of media objects, presentation segments, and navigation techniques that allow a user to move between related media objects and presentation segments

**3.7**
**basic structures**
structures used as the basis for creating all other structures

NOTE The three basic structures are linear structures, tree structures, and network structures.

**3.7.1**
**linear structures**
structures that organize their elements in a sequence

NOTE 1 Linear structures may include sequences where media objects are presented in parallel.

NOTE 2 An example of a linear structure of content chunks or presentation segments is illustrated in Figure 1.

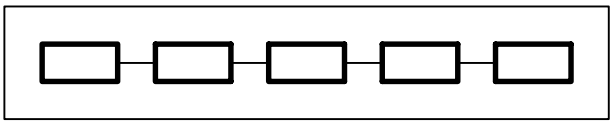

**Figure 1 — Example of a linear structure**

**3.7.2**
**tree structures**
structures that organize their elements in a hierarchical manner, where each component is associated with only one higher-level component and may be associated with multiple lower-level components

NOTE An example of a tree structure of content chunks or presentation segments is illustrated in Figure 2.

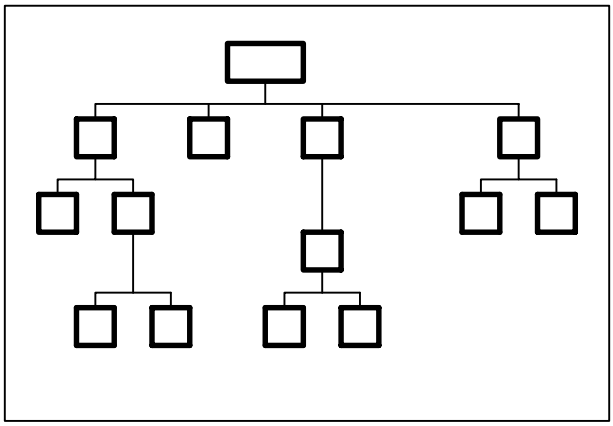

**Figure 2 — Example of a tree structure**

**3.7.3**
**network structures**
structures that organize their elements in a manner where each component may be associated with multiple other components

NOTE An example of a fully connected structure of content chunks or presentation segments, where all chunks or presentation segments are connected to all other content chunks or presentation segments, is illustrated in Figure 3. An example of a partly connected structure of content chunks or presentation segments, where all content chunks or presentation segments are not necessarily connected to all other content chunks or presentation segments, is illustrated in Figure 4.

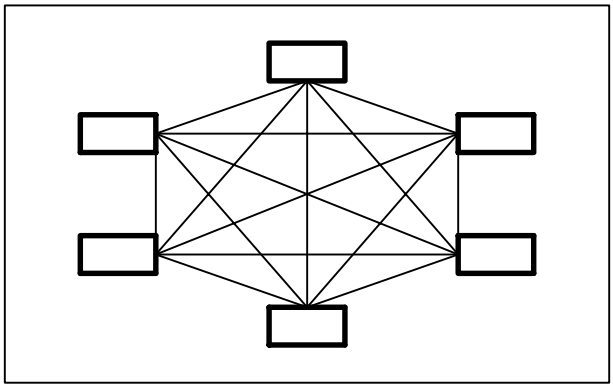

**Figure 3 — Example of a fully connected network structure**

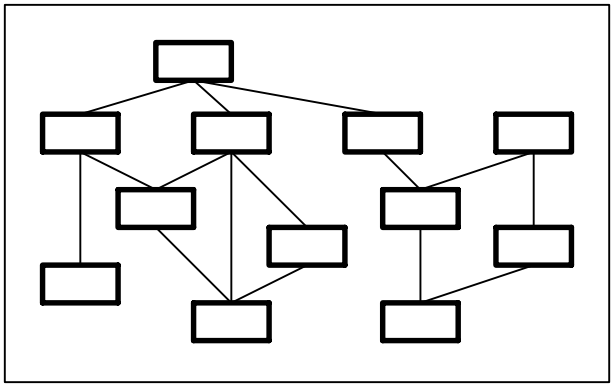

**Figure 4 — Example of a partially connected network structure**

**3.8**
**control**
object, often analogous to physical controls, which allows a user to take some action which manipulates data, other objects or their attributes

**3.8.1**
**navigation control**
control that allows users to navigate within an application

**3.9**
**link**
connection, among or within media, which starts with a control and ends at a specified location

**3.9.1**
**system-activated link**
link that is activated by some system action

EXAMPLE A link is activated by the completion of some time delay in an automatic slide show.

**3.9.2**
**user-activated link**
link that is activated by some user action

EXAMPLE 1 A link is activated by the user placing the cursor over the link and clicking on the left mouse button.

EXAMPLE 2 A link is activated by the user selecting the third choice in a menu of links.

**3.9.3**
**fixed link**
permanent link that can be activated whenever the medium containing the link is presented

EXAMPLE 1 The user clicks on a word and is provided with a description of what the word means.

EXAMPLE 2 The user clicks on an animated icon which starts a video presentation.

**3.9.4**
**temporal link**
link that is only available for a certain period of time while the medium containing the link is presented

EXAMPLE 1 Links to descriptions of characters are made available only while the characters are visible in a video sequence.

EXAMPLE 2 A link to descriptive information is available only during the first 20 s of viewing a picture.

**3.9.5**
**computed link**
temporary link, created on demand where the location linked to is dynamically determined based on the state and/or history of the system

EXAMPLE The results of a search include several links to different parts of the application that will be replaced by the results of any subsequent search.

**3.9.6**
**user-defined link**
permanent or temporal link created by a user during the use of an application that is intended to supplement the links created by the application

EXAMPLE The user creates a bookmark to go directly to a given location within an application.

**3.10**
**cue**
cue gives an indication of opportunity for further information

EXAMPLE A small animation on top of a link is used to provide a visual cue indicating the kind of content to be expected on following the link.

**3.11**
**guided tour**
linear navigation structure presenting significant portions of the application usually intended to introduce the content and capabilities available to the user

NOTE Different tours can be provided to meet different user needs.

# 4 Application of this part of ISO 14915

## 4.1 Purpose and intended users of this part of ISO 14915

The following groups are the intended users of this part of ISO 14915:

— user interface and multimedia designers who will apply this part during the development process;

— evaluators responsible for quality assurance who will ensure that products meet the recommendations of this part;

— potential buyers, in selecting appropriately designed multimedia products;

— designers of multimedia-development tools to be used by user interface and multimedia developers.

## 4.2 Reporting conformance to this part of ISO 14915

If a product or application is claimed to have met the applicable recommendations in this part of ISO 14915, the procedure used in establishing requirements for developing and/or evaluating the multimedia user interface shall be specified. The level of specification of the procedure is a matter of negotiation between the involved parties. ISO 14915 is a multi-part standard and therefore claims of conformity relate to the individual parts and not to the International Standard as a whole.

# 5 Framework for multimedia navigation and control

## 5.1 General

This clause provides a framework for identifying ergonomic considerations in analysis and design of navigation and control in multimedia applications.

It provides a basis for analysing content structures, designing navigation structures of presentations, and developing designs of controls.

## 5.2 Analysis of content structures

### 5.2.1 Basic analysis

Navigation structures of multimedia applications can be built on the content structure.

Multimedia systems often provide information organized according to users' tasks. Systems intended for a single (or a generic group of) user(s), familiar with the specific tasks to be performed, often can be structured

based on a commonly accepted structure of the tasks. Additional general tasks, of learning and/or exploring the system, can present additional structuring needs. Where multiple groups of users might have differing needs, a single task based structure might be difficult or even impossible to agree upon.

The content to be represented in a multimedia application can be analysed in terms of

— content chunks, that correspond to important concepts within the application domain, or

— a content structure that specifies the relationship between individual content chunks.

There are a number of potential semantic approaches to structuring content, including, but not limited to, the following concepts.

a) **Task-based structuring**, where the content structure is determined by the structure of the tasks of the application. Different users might require different task structures, based on different subsets of the complete set of available tasks and/or other user differences.

b) **Usage-based structuring**, where the structure is arranged in the order which users are expected to apply the content, e.g. by importance, frequency of use or individual viewpoints. Since it involves users, different users might require different structures and different chunks of content.

   1) **Importance-based structuring**, where the content is structured based on the estimated order of relative importance of different chunks of content to the user. Different structures might correspond to differences in relative importance of different content chunks to different users.

   2) **Frequency of use structuring**, where the content is structured based on the estimated order of relative frequency of use of different chunks of content to the user. Different structures might correspond to differences in relative frequencies of use of different content chunks to different users.

   3) **Order of use structuring**, where the content is structured based on the estimated order of use of different chunks of content to the user. Different structures might correspond to differences in orders of use of different content chunks to different users.

   4) **Conventional structuring**, where the content is structured in the traditional way that it is described, taught, presented to people becoming acquainted with it, or in the traditional way that it is organized by researchers in the field. This traditional structure might include one or more other structuring approaches.

c) **Time-ordered structuring**, where the content is identified and structured based on times or dates that apply to the content.

   1) **Time-sequenced structuring**, where unique times or dates are involved, a time ordered structure will be a linear sequence. Where overlapping periods of time are involved, a nonlinear structure may be required.

   2) **Historical structuring**, where the content is structured based on the order of its development / discovery or causes and effects. Because various developments and/or discoveries can build on a number of previous ones, historical structuring need not be a totally linear order.

d) **Information-model-based structuring**, where the content structure is determined by a model of the information (e.g. in categories, entities and attributes, objects or classes of objects).

   1) **Logical-group structuring**, where the content is structured in clusters based on some set of major logical concepts. Individual chunks of content can appear in multiple locations in such a structure.

   2) **Alphabetical-order structuring**, where the content is alphabetically structured based on an index of meaningful descriptors. While the overall effect of an alphabetical ordering is to produce a linear structure, a tree structure may be used to assist in accessing large numbers of entries.

3) **Generalization granularity structuring**, where content is organized from general to specific or from specific to general. While similar to the software engineering of classes of objects, this form of structuring is often used in pedagogy to assist people in developing an understanding of various types of content.

e) combinations of approaches used to meet different uses.

NOTE 1 Different information providers might each structure the content they provide based on different approaches.

NOTE 2 In some applications, such as electronic-performance support systems, the needs of the tasks can override other structuring considerations in order to limit to options available to a user at any point within the application structure.

#### 5.2.2 Structuring multimedia applications

Semantic approaches to structuring content should be used in structuring multimedia applications in order to facilitate

— performing the task,

— learning, and

— exploring the system.

### 5.3 Navigation-structure design

#### 5.3.1 General

The navigation structure determining the users' access to the information content needs to be developed as part of determining the high-level design of a multimedia application. The navigation structure includes

— high-level navigation between coherent presentation segments, and

— navigation within presentation segments and within media objects.

#### 5.3.2 High-level navigation structure

##### 5.3.2.1 Basic concept

Whereas content chunks are semantic in nature and typically have only logical boundaries, presentation segments represent physical implementation of one or more content chunks and have physical boundaries. Navigation controls can identify and make use of physical boundaries as locations for navigation actions. Examples of presentation segments include: a web page containing a task procedure, a window containing several media describing some topic or a coherent section of an audio presentation teaching some concept.

Presentation segments contain both information content and the navigation controls and links to allow users to access this information content. The design of presentation segments should be based on the structure of content chunks in order to facilitate the user's understanding of the content structure. Presentation segments can present

— single content chunks,

— larger parts of the content structure with multiple content chunks, and

— part of a content chunk, where the content chunk is divided across multiple presentation segments.

High-level navigation design involves the mapping of content chunks to presentation segments. This mapping can be one to one (e.g. {A → 1}, {C → 3}, {A1 → 1X}, {A2 → 1Y}), many to one (e.g. {B1, B2, B3 → 2}) or one to many (e.g. {C1 → 3X, 3Y}, {C2 → 3Y, 3Z}) as illustrated in Figure 5.

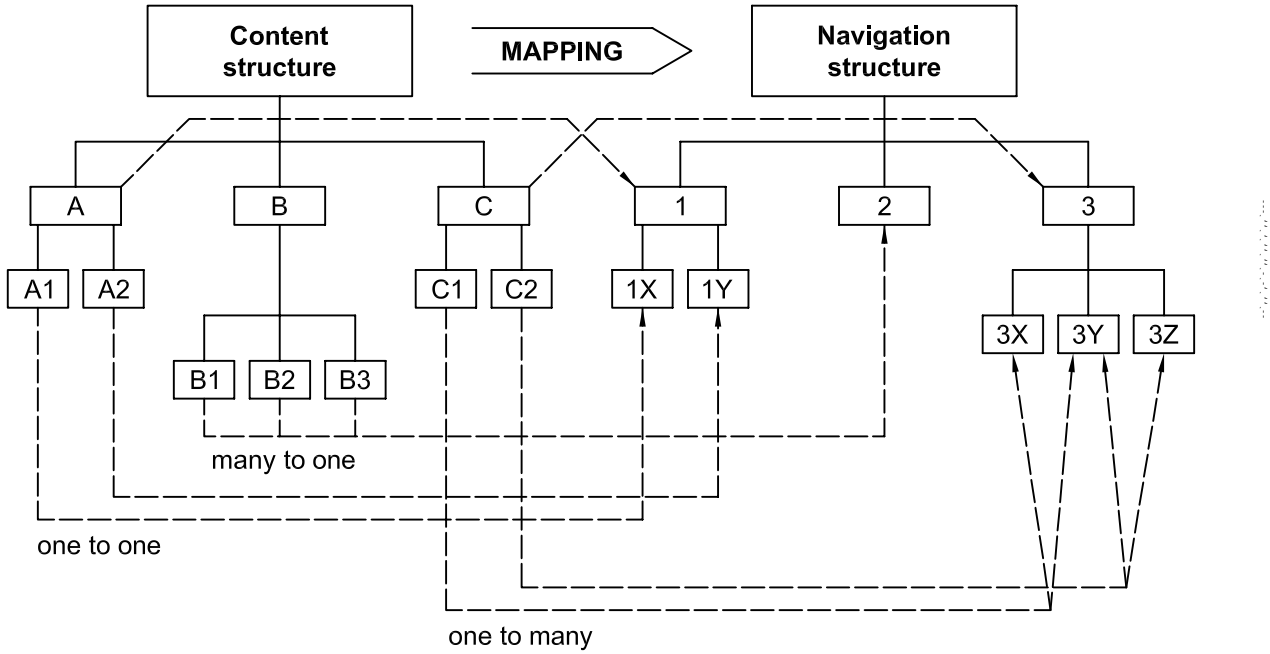


**Figure 5 — Example of mapping content chunks to presentation segments**

Information recipients (based on the above concept of content chunks) might need or wish to be able to access individual content chunks regardless of how these chunks are physically implemented and presented.

Meeting these needs involves designing navigation capabilities that can take the user both to presentation segments (that are part of the multimedia design) and to particular content chunks (within presentation segments). Moving between presentation segments can have a greater impact on the user's future options than moving between content chunks within a particular content segment, because the user may not be able to return to a previously visited presentation segment.

NOTE The user may need additional information, beyond content, (e.g. a table of contents or a content map) to be able to use a navigation structure.

#### 5.3.2.2 Mapping content and navigation structures

The navigation structure should provide appropriate access to content structures within a multimedia application.

#### 5.3.2.3 Navigation across presentation segment boundaries

Users should be informed where navigation actions will cause them to replace the current presentation segment with a different presentation segment.

EXAMPLE Web browsers display the address of a link when a user selects the link before the user activates the link to allow the user to decide whether or not to follow that link. Addresses of links to a new Web page are significantly different from links to locations on the current Web page.

### 5.3.3 Navigation within presentation segments and media objects

#### 5.3.3.1 Basic concept

Presentation segments are implemented by one or more media objects (which are used to present content to information recipients). Examples of media objects include: a scrollable text object, a graphic image or a video clip.

Low-level presentation design involves the selection and positioning of media objects within presentation segments of various sizes. Media objects within a single presentation segment can be presented either sequentially, in parallel or in a combination of manners.

EXAMPLE A window contains a text object and several video clips.

Media objects can range in size from presenting a structure of content chunks to presenting only a portion of a content chunk. Figure 6 illustrates how eleven media objects within a single presentation segment can be used to present four content chunks (content chunk A to content chunk D).

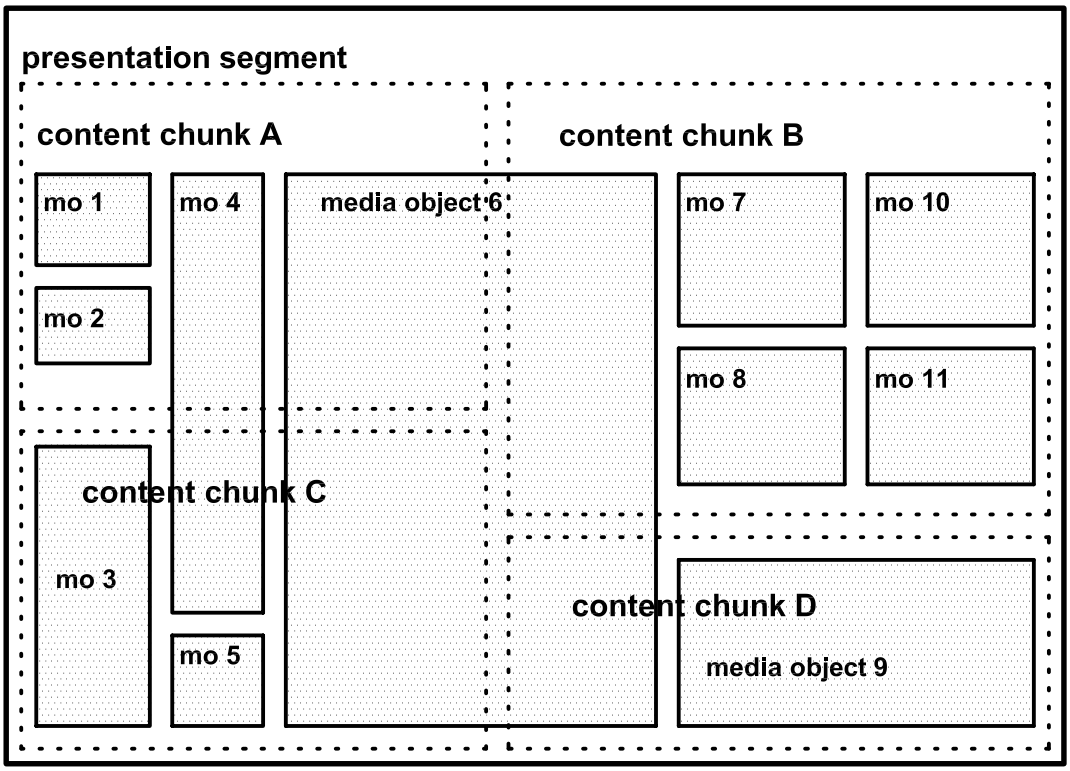


**Figure 6 — Presentation segments, content chunks and media objects**

The correspondence between media objects, presentation segments, and content chunks is a major concern during detail design. The main source of concern involves providing information recipients with the capability to navigate to the content they want or need as efficiently as possible.

Users might need to interact with a composite media object, rather than having to interact with each media object independently. Composite media objects allow navigation actions towards a number of media objects that are intended to be used together in parallel and/or in series.

By recognizing that composite media objects can also contain a single media object, the focus in navigation design can shift from individual media objects to composite media objects.

Composite media objects can be used to synchronize a media stream. When composite media objects are organized in sequences, the synchronization between objects and the whole sequences may need to be considered in designing the navigation structure.

#### 5.3.3.2 Access to content chunks

Media objects which cross content-chunk boundaries should have access points that allow navigation to the boundaries of each content chunk that they cross.

EXAMPLE 1 A user is provided with the ability to move to the next or previous topic within a text object that discusses a number of topics.

EXAMPLE 2 A movie that presents a number of content chunks in sequence provides the user with the ability to move from anywhere within the current content chunk to the start of the next content chunk.

# 6 Navigation design

## 6.1 Introduction to navigation

### 6.1.1 Application structure

The design of a multimedia application should consider the structures of presentation segments, content chunks, and composite media objects in accordance with Clause 5.

### 6.1.2 Navigation structures

Design of navigation structures within a multimedia application should meet the needs of the users and the tasks within technological constraints (such as computational requirements, media limitations, physical limitations and access speed/band width). The navigation structure should

— minimize the number of user inputs required for a user to locate a presentation segment, and

— minimize the amount of effort required for a user to locate the required content within a presentation segment,

If appropriate to the task, multiple ways to access the content should be provided to accommodate for different user needs and expectations.

EXAMPLE An expandable table of contents, an index, and a search engine can provide alternate methods of accessing content.

### 6.1.3 Content structure

The system should allow users to navigate to the particular content chunk that meets their current task needs.

This can involve different amounts and/or types of content including

— an introduction to the content topic,

— detailed information on the content topic,

— specialized information on a particular use of the content,

— examples of the use of the content, and

— references to related content.

### 6.1.4 Content granularity

Content should be structured to reflect the level of detail needed in the different tasks or expectations of the user.

If content exists at various levels of granularity (specificity) then the navigational structures should provide access to each of these levels.

NOTE Concern for granularity in structuring is referred to by a variety of names including layering and progressive disclosure.

### 6.1.5 Exploration

If appropriate to the task, the navigation structure should allow the user to explore the entire content structure of a multimedia application.

NOTE In some applications, some users might only be allowed to explore selected portions of the content structure. Alternatively, navigation structure can allow limited access to some users (e.g. novices) and full access to others (e.g. experts).

### 6.1.6 Complexity

The complexity of the navigation structure should be appropriate to the demands of the user's goals and tasks.

EXAMPLE Where the task(s) are performed sequentially, only a linear navigation structure is required.

### 6.1.7 Understanding

If navigation structure is not consistent with the users' expectations or understanding of the content then the principles behind the structure should be clearly communicated to the user.

NOTE When developing a novel interface there may be no previous user expectations to conform to.

### 6.1.8 User assistance

Where users might require assistance in navigating, appropriate assistance relative to navigation should be provided.

EXAMPLE 1 The user is provided with an overview of the content and navigation structures.

EXAMPLE 2 The user is recommended a path to follow through the content and navigation structures.

EXAMPLE 3 A context-sensitive help system guides the user through the tasks.

NOTE It is preferable that users be allowed to navigate directly to the content they require, without having to go through unnecessary intermediary stages. However, intermediary steps and/or other forms of assistance might be appropriate, where users are unsure of the particular content they require.

### 6.1.9 Determining navigation techniques

The tasks, the users, and the nature of the content should be considered in deciding whether navigation at a given point within an application is

— automatic navigation,

— predetermined navigation,

— user-determined navigation, or

— adaptive-determined navigation.

#### 6.1.10 Metaphors

If metaphors are used to support navigation:

a) metaphors should represent the navigation structure in a suitable manner;

b) metaphors should be capable of representing all necessary components of the navigation structure;

c) metaphors should relate to the user's experience and expectations;

d) any limitations of the metaphor should be communicated to the user;

e) metaphors should not degrade task performance.

NOTE Metaphors can also be used to represent the content structure in a suitable manner.

### 6.2 Structures for navigation

#### 6.2.1 Use of appropriate navigation structures

Navigation structures based on the needs of users, tasks and content should be developed from linear structures, tree/hierarchical structures, network structures and/or combinations of these structures.

#### 6.2.2 Linear structures

##### 6.2.2.1 Use of linear structures

Linear structures should be used when the users' expectation or task implies sequential dependency or temporal ordering.

NOTE 1 A linear navigation structure can also be employed to limit a certain type of users (e.g. beginners) to a predefined navigation path through a system (e.g. in the form of a guided tour).

NOTE 2 Linear structures can be particularly appropriate to allow to follow a logical linear path throughout an application, without being required to do so. This use of logical linear structures can allow for a range of different tours within the same application.

##### 6.2.2.2 Organization of linear structures

Linear structures should be designed on the basis of one or more of a variety of rationales:

— task-based structuring,

— usage-based structuring,

— time-ordered structuring,

— information-model-based structuring.

##### 6.2.2.3 Start of a linear structure

If it is necessary to define a start to return to, the start of a linear structure should be obvious to the user.

NOTE The start of a tree structure is typically the highest level of the hierarchy.

#### 6.2.2.4 Navigation in linear structures

If appropriate to the task, the system should provide a means for the user

— to go back and forward to locations in the structure,

— to go to the beginning or the end of the structure, and

— to directly access a determined location within the structure.

EXAMPLE 1 The user goes from one page to the next (or previous) page in a multi-page chapter.

EXAMPLE 2 The user goes forward (or back) to a particular sentence within a text object.

EXAMPLE 3 The user goes forward (or back) to a particular verse within a song being presented via an audio object.

EXAMPLE 4 The user goes from a location within a page to the start of a page.

EXAMPLE 5 The user goes from a subsequent page in a multi-page chapter to the first page of the chapter.

EXAMPLE 6 The user navigates between different audible messages by skipping the remainder of the current message.

NOTE 1 These locations to navigate towards are usually appropriate, unless there is a reason to exclude them.

NOTE 2 Linear structures limit the ability of users to go to a particular element within the structure to using sequential access. However, this ability can be added by providing a search control and/or providing support for creating bookmarks to specific locations.

NOTE 3 Additional navigation functionality can be found in Clauses 8 and 9.

### 6.2.3 Tree structures

#### 6.2.3.1 Use of tree structures

Tree structures should be used when the content can be hierarchically clustered into logical units with regard to subjects that can be defined at different levels of detail.

NOTE 1 Tree structures can be particularly appropriate when the content is complex.

NOTE 2 A default linear path can be provided to assist users to navigate through a tree structure in a linear order.

EXAMPLE 1 An application provides users with progressive disclosure of content: an introduction; the details; and background to the details..

EXAMPLE 2 An electronic document is structured into chapters and subchapters.

#### 6.2.3.2 Organization of tree structures

Tree structures should be designed on the basis of one or more of a variety of rationales:

— decomposition of the content;

— decomposition of user tasks;

— decomposition of temporal relations;

— alternate needs of different groups of users;

— other rationales as given in 6.2.2.2.

#### 6.2.3.3 Start of a tree structure

If it is necessary to define a start to return to, the start of a tree structure should be obvious to the user.

NOTE The start of a tree structure is typically the highest level of the hierarchy.

#### 6.2.3.4 Navigation in tree structures

If appropriate to the task, the system should provide a means for the user to

— go back and forward within a level in the structure,

— go up and down in the structure,

— advance in larger steps (e.g. page to page or other groups of chunks),

— go to the first/main layer,

— go to the beginning or the exit of the structure, and

— go to a table of contents or index.

NOTE Additional navigation functionality can be found in Clauses 8 and 9.

### 6.2.4 Network structures

#### 6.2.4.1 Use of network structures

Network structures should be considered when there are multiple relationships between individual content chunks.

NOTE A default linear path can be provided to assist users to navigate through the network structure in a linear order.

#### 6.2.4.2 Organization of network structures

Network structures should be designed on the basis of one or more of a variety of rationales:

— the needs of different applications or tasks;

— the needs of different groups of users;

— the needs of different organizations of the content;

— the needs of temporal relations;

— other rationales as given in 6.2.2.2.

#### 6.2.4.3 Start of a network structure

If it is necessary to define a start to return to, the start of a network structure should be obvious to the user. Since network structures have multiple possible starts, the concept of a start can be defined in a variety of ways, including

— a system-identified default start,

— the location where the user started using the structure, independent of the starting point of the application, and

— some location defined by the user as the preferred start location.

#### 6.2.4.4 Navigation in network structures

The user should be presented a meaningful structure of navigation alternatives where the differences between these alternatives are made explicit. If appropriate to the task, the system should provide a means for the user to

— go back to the previous content topic,

— go to any related content topic, or

— go to a table of contents or index.

NOTE Additional navigation functionality can be found in Clauses 8 and 9.

# 7 Common guidance on controls

## 7.1 Compatibility of media controls

If hardware controls are anticipated when software controls are also developed for the same functions, these software controls should be compatible in behaviour and/or appearance with the hardware controls.

EXAMPLE The software emulates the design and functionality of video cassette recorder buttons.

## 7.2 User accessibility of controls

While direct manipulation is the preferred method of users activating controls, alternate implementations should be available to support accessibility as specified in ISO/TS 16071.

## 7.3 Ease of individualization

If there are choices of media, it should be easy for the user to select between them.

EXAMPLE The user is able to output information in either or both audio and/or video presentations.

## 7.4 Appropriateness of media controls

The system should provide the user with media-control functions that are appropriate for the current media and the user's task(s).

EXAMPLE A scroll bar is used for moving through text.

## 7.5 Task-dependent sets of controls

Depending on the current task(s) of the user, different sets of controls may be made available to the user.

EXAMPLE Users being tested on their knowledge of a concept may not be allowed to control the playing and replaying of composite media objects. However, users learning the concept may be allowed to control the playing and replaying of the same composite media objects.

## 7.6 Minimum set of media controls

If it is not suitable to present all controls at the same time, a minimum set of controls should be provided which the user can always access directly and easily.

EXAMPLE 1 A scroll control is the only currently displayed media control while moving through a large text object.

EXAMPLE 2 Play and stop are provided at all times for a dynamic medium.

## 7.7 Grouping media controls

Media controls should be presented in logical groupings (see 5.6 of ISO 9241-12:1998).

EXAMPLE 1 Controls for setting of video attributes (hue, saturation, brightness) are presented together.

EXAMPLE 2 Controls for dynamic media (play, fast forward, rewind) are presented together.

## 7.8 Controllability of media objects

The system should provide the user with a means to select and control media objects.

EXAMPLE Push buttons are provided to select between alternate media.

## 7.9 Distinguishable controls

Controls should be distinguishable from other presented information. The following are some of the attributes or methods that can provide this distinguishability:

— controls are visually obvious (e.g. by size, colour, shape and/or location).

— controls are labelled.

— controls become distinguished upon pointer positioning within an area of the presentation before activating the control.

— if controls are not obvious (e.g. to minimize clutter or to meet requirements of the task) the user is provided with a means to get information about available controls.

— the user is informed by the system of the relationship between the screen and embedded controls.

— the user is informed by the system of the ability to use voice-activated controls within the current portion of the active application.

## 7.10 Presence of hidden controls

If controls only become distinguished upon a pointer being located within the area containing the control, there should be a clear indication that controls are located within the presentation and that the presence of the controls will become visible upon moving the pointer over an area containing a control.

## 7.11 Status of media

The actual status of available media should always be accessible.

EXAMPLE 1 The user is able to determine the download status of a web page.

EXAMPLE 2 The user is able to determine the play status of a video.

EXAMPLE 3 The user is able to determine the location within a video.

## 7.12 Status of controls

The actual status of available controls should always be accessible.

EXAMPLE Activated controls are displayed in reverse to distinguish them from other available controls that are displayed in normal format.

## 7.13 Inactive controls

The inactive status of controls that are usually available but are not currently active should be clearly indicated.

EXAMPLE Controls not currently available are displayed in light grey to distinguish them from available controls that are displayed in black.

## 7.14 Consistent controls

Controls should be presented and should function in a consistent manner for all media where they are available.

EXAMPLE Links (e.g. hypertext links) which provide access to another section of the current media or to another medium are all activated with a single click.

NOTE Consistency can involve

— the medium being controlled,

— the medium in which the controls are being used,

— general guidance on the design of controls (e.g. ISO 9241-12), and

— general guidance on user guidance (e.g. ISO 9241-13).

## 7.15 Ease of access

Controls should allow individual users ease of access to media components that serve their individual needs.

NOTE This might require controls to be implemented in methods compatible with enabling accessibility for users with special needs (as described in ISO/TS 16071).

## 7.16 Feedback on use of controls

The system should provide users with immediate feedback regarding the effects of their use of controls in accordance with Clause 6 (Manipulation of objects) of ISO 9241-16:1999.

## 7.17 Relation of controls

The relation of controls to the controlled medium/media should be made obvious to the user.

EXAMPLE 1 Where multiple similar controls are visible, they are clearly labelled to distinguish them from each other and to relate them to the medium that they control.

EXAMPLE 2 The controls are placed in a consistent position in relation to (e.g. immediately below) the element being controlled.

### 7.18 Design of particular controls

Individual controls should be designed according to the dialogue types in which they are implemented. Designers should refer to the following International Standards, where appropriate:

— ISO 9241-12 provides general guidance on display-based presentation of information;

— ISO 9241-13 provides recommendations on providing user guidance;

— ISO 9241-16 provides guidance on direct manipulation dialogues; and

— ISO/IEC 18035 provides guidance on icon symbols and functions for controlling multimedia software applications.

## 8 Links

### 8.1 User accessibility of links

While direct manipulation (in the form of selecting a displayed object with a pointing device) is the preferred method of users activating links, alternate implementations should be available to support accessibility as specified in ISO/TS 16071.

### 8.2 Use of links

#### 8.2.1 General use of links

Links should be used to allow the user, the system or a combination of the user and the system to navigate between particular locations within a multimedia application.

EXAMPLE 1 A link in a text object is used to start playing a video object that helps illustrate material being described at that point within the text.

EXAMPLE 2 A temporal link, associated with a video object that is playing, is used to display a text object that provides biographical information about a person who is seen in the video object while the video continues playing.

EXAMPLE 3 A link in a picture object is used to display a text object that provides a critique of the artistic composition of the picture object.

NOTE Links are particularly appropriate for all navigation actions between content chunks, since the boundaries of content chunks may not be obvious to the user.

#### 8.2.2 Use of system-activated links

Where appropriate to the task(s), system-activated links should be used where

— media need to be synchronized or serialized within a composite media object, or

— task(s) require the system to control the order and timing of presentation.

#### 8.2.3 Use of user-activated links

Where appropriate to the task(s), user-activated links should be used wherever the task(s) require(s) the user to navigate to/between specific locations within an application.

### 8.2.4 Use of fixed links

Fixed links should be used whenever a link needs to be always available at a given location within a presentation segment.

### 8.2.5 Use of temporal links

Temporal links should be used whenever access to content needs to be limited to certain times within the use of a presentation segment.

EXAMPLE 1 A link to a hint is presented only after a fixed period of time where the user has not responded.

EXAMPLE 2 Links to supplementary explanations are only presented during applicable times during a video presentation.

NOTE 1 The duration of a temporal link can be based on a set time from its first appearance or can persist as long as certain conditions exist within the presentation segment.

NOTE 2 If required by the task, a temporal link may repeatedly become available based on changing conditions within the presentation segment.

### 8.2.6 Duration of temporal links

The duration of a temporal link should be sufficiently long to be appropriate to the presentation, the task, and the user's ability to use it. Temporal links should be available consistently for at least enough time for users

a) to identify them,

b) to form the intention to follow them, and

c) to activate them.

### 8.2.7 Avoiding temporal-link errors

In order to avoid errors in activation, the availability of different temporal links at the same position should be separated from each other by sufficient time to ensure that the intended link is selected.

EXAMPLE Selecting a temporal link by issuing a verbal command to "GO" to topic A is separated from a temporal link to "GO" to topic B by a period of 5 s during which the verbal command "GO" will not activate any link.

### 8.2.8 Use of computed links

Computed links should be used when

a) the information content of the application changes over time,

b) the needs of the user(s) cannot be fully determined in advance, and

c) the users' tasks change over time.

EXAMPLE Web-search engines provide computed links in order to give up-to-date results for each search and to develop answers for a wider variety of searches than could be anticipated and designed into a fixed set of menus.

### 8.2.9 Recognizing computed links

If appropriate to the task, the system should make the user aware when a link is a computed link.

EXAMPLE 1 Computed links to a product selection generated from a database are displayed by an e-commerce-application using a different type face from that used to display fixed links.

EXAMPLE 2 A unique symbol is used at the start of each computed link to indicate that it is a computed link.

NOTE 1 Computed links may not be available, for various reasons (often related to changes in the available information), at a point in time later in the use of the application.

NOTE 2 This is especially important if the presentation segment must be recalculated prior to being reloaded.

#### 8.2.10 Saving computed links

Where appropriate to the task, the system should allow users to save sets of computed links so that they can be used as required and where possible.

#### 8.2.11 Creating user-defined links

Where appropriate to the task, a control should be provided for users to create links to the current location in the application. This control should save all the relevant locations in each of the media objects currently in use.

User-defined links may be

— stored in a single location that is permanently accessible throughout the application (e.g. a bookmark file), or

— stored as links to annotations that are presented at a particular location within a given presentation segment.

EXAMPLE 1 A user is allowed to bookmark presentation segments for possible future return to them.

EXAMPLE 2 A user is allowed to save the location within an audio object to be able to return directly to that part of the presentation.

EXAMPLE 3 A user creates an annotation and a link to it to record an impression of a picture that is being viewed for the first time.

#### 8.2.12 Multi-user sets of user-defined links

When an application is used by multiple users, it should save each user's user-defined links separately. When appropriate to the task, the system should allow users to use

— only those links that they have defined,

— all links defined by some set of users, or

— all links defined by all users.

EXAMPLE 1 Each Web user defines and uses a unique and personal set of bookmarks.

EXAMPLE 2 Each user of a training application makes use of both the links that they have personally defined and those defined by the instructor.

EXAMPLE 3 Each user, in a group of students, makes use of all the links defined by the group.

### 8.3 Discriminability of links

Each link in a presentation segment should be discriminable from all other links in that presentation segment and from other parts of the presentation.

EXAMPLE 1 Textual links are displayed in a unique colour, shape, font or style from other textual material.

EXAMPLE 2 If links to multiple examples are contained in a presentation segment, they each have different names, such as: EXAMPLE 1, EXAMPLE 2, EXAMPLE 3.

EXAMPLE 3 Links created by each member of a group are displayed prefixed by the initials of the member who created them.

EXAMPLE 4 Links to PDF files are prefixed with a PDF symbol.

## 8.4 Information about links

### 8.4.1 Link-destination content information

The system should allow the user to determine information about the content of the destination of the link.

NOTE This can be provided by a number of methods including

— a self descriptive name, rather than a meaningless link name like “click here”,

— a distinctive icon that will be recognized by the user, and

— additional descriptive content.

EXAMPLE The user can evaluate additional descriptive content before following a link.

### 8.4.2 Link-destination location information

The system should allow the user to determine whether the destination of the link is internal or external to the current presentation segment.

NOTE If the user follows a link to an external presentation segment, the user can have difficulties returning to the current presentation segment, especially if it was dynamically created.

EXAMPLE Internal text links appear in regular type and external text links appear in bold type.

### 8.4.3 Link-duration information

The system should allow the user to determine information about the duration of the link.

NOTE A user can need this information to optimize the choice between a fixed link, a temporal link, and a computed link in order to avoid missing opportunities to visit certain contents.

EXAMPLE 1 A user recognizes a temporal link because it has an hour-glass symbol as the start of its name.

EXAMPLE 2 A user recognizes a computed link because its name is italicized.

EXAMPLE 3 A user recognizes a fixed link due to the absence of any coding suggesting that it is temporal or computed.

### 8.4.4 Linked-to-media-type information

If media type might cause problems to the user, the system should allow the user to determine information about the type of media that is being linked to.

NOTE If a user’s system does not have the capacity to handle certain types of media, the user would wish to be able to avoid links to that type of media.

EXAMPLE The displayed description of a link states that the linked-to-media is a streaming media. This warns users who cannot process that type of media not to follow the link.

#### 8.4.5 Link-load-time information

Where appropriate to the task, the system should allow the user to determine information about the time required to load the linked chunk.

EXAMPLE Knowing the size of a picture helps a user decide whether or not to spend the time that would be required to load it.

#### 8.4.6 Link-history cues

Where appropriate to the task, and where it would not disrupt the presentation of content, the system should provide the user with a link-history cue for each link that indicates whether or not the user has previously visited the location referenced by that link.

NOTE 1 Link-history cues are more appropriate for exploring content than for repetitive processing tasks.

NOTE 2 Link-history cues can include information on how recently the location referenced by the link was visited by the user.

#### 8.4.7 Multiple sets of link-history cues

Where multiple users will be individually identified by the application, the system should provide all users with their own set of link histories that only record content that they have individually visited.

#### 8.4.8 Time dependence of link-history

The duration of link-history cues should be determined by the needs of the task and the individual users.

#### 8.4.9 Default link-history cue

The default state for all link-history cues should indicate that the links have not been followed.

#### 8.4.10 Resetting link-history cues

The system should allow the user to easily reset all link-history cues to their default state.

#### 8.4.11 Resetting single link-history cues

The system should allow the user to reset a single link-history cue to its default state.

## 9 Navigation functions

### 9.1 Scope of navigation actions

#### 9.1.1 Providing users with navigation information

The system should provide information to support users' navigation requirements.

NOTE This information can be continuously presented or only presented upon user request.

EXAMPLE 1 A site map helps users to find their way in a content structure so that they can learn the structure for future use.

EXAMPLE 2 An index helps users to locate a specific item of content.

### 9.1.2 Effect of navigation actions

The system should make the effect of a navigation action obvious to the user. Navigation actions may effect

— the entire application,

— a presentation segment,

— a content chunk,

— a composite media object, or

— a specific media object.

NOTE 1 This distinction can be accomplished by using context-sensitive controls or by positioning individual controls relating to the application as a whole separately from those for particular media.

NOTE 2 Physical limitations can constrain logical capabilities.

NOTE 3 The use of controls on content chunks can pose problems, if the user is not aware of the intended boundaries of the content chunk.

EXAMPLE 1 The user is able to determine whether a “go to start” control will go to the start of the application or to the start of the current content chunk.

EXAMPLE 2 The user is able to recognize whether a volume control will effect all sound chunks in the application or only the currently playing sound chunk.

EXAMPLE 3 A user is warned that, if a certain navigation action is taken, then the user will not be allowed to return to the current location in the application.

### 9.1.3 Navigation between and within presentation segments

The system should allow the user to distinguish between navigation between presentation segments (where one presentation segment is replaced by another presentation segment) and navigation within a presentation segment.

### 9.1.4 Methods of navigation between presentation segments

There are two methods for navigating between presentation segments.

a) Links should be used for navigation between specific presentation segments.

b) If general navigation functions (such as: “Go to beginning”, “Go to previous”) are desired for navigation through the application structure, controls should be used that work consistently throughout the application.

EXAMPLE Sets of navigation controls located on the top or left side of a presentation segment, in a latin-based language, link to other presentation segments.

### 9.1.5 Navigation involving content chunks within a presentation segment

If users are to navigate within or between content chunks within a single presentation segment, the system should make the destination of the navigation obvious.

EXAMPLE 1 The user uses a scroll control while observing the resulting scrolling to advance within a content chunk.

EXAMPLE 2 The user uses a link to advance to the beginning of the third content chunk within a presentation segment.

#### 9.1.6 Navigation involving media objects or composite media objects

If users are to navigate within or between content chunks within a media object or a composite media object, the system should make the destination of navigation obvious by using

a) a link, and/or

b) a control that is obviously related to the media that it controls.

### 9.2 "Go to beginning"

Where appropriate to the task(s), the system should provide controls that will take the user

— to the start of the entire application,

— to the start of the current presentation segment, and

— to the start of the current media object.

EXAMPLE 1 A "main menu" control is provided to take the user to the start of the application.

EXAMPLE 2 A "home" control is provided to take the user to the start of the current presentation segment.

EXAMPLE 3 A different "home" control is provided within textual chunks that are displayed visually.

EXAMPLE 4 A "rewind" control is provided for dynamic media objects.

### 9.3 "Go to previous"

#### 9.3.1 Go to previously visited presentation segment

Where appropriate to the task(s), the system should provide a method to enable the user to easily locate and revisit previously visited presentation segments.

NOTE 1 This method would provide the ability to find and return to a particular location within a sequence of static displays and the ability to find and replay identifiable sequences of dynamic composite-media objects.

NOTE 2 The implementation of this method requires that the application keep track of at least the user's most recent history of navigating through the application.

EXAMPLE 1 The user uses a "BACK" control on a Web browser.

EXAMPLE 2 A dialogue history file, or a visit list organized in the sequential history of access, is provided to allow users to revisit presentation segments. Entries in it are coded to indicate the part of an application to which they belong.

EXAMPLE 3 The user points to an entry on a visit list showing the sequence of presentation segments accessed during the session. Double clicking on the entry changes the display to the previously visited presentation segment.

#### 9.3.2 Go to previous media object

Where appropriate to the task(s), the system should provide a control to take the user to the previously visited media object within a composite media object.

EXAMPLE A "previous clip" control will move the user to the previous movie clip within a multi-clip sequence of movies.

#### 9.3.3 Save current state

Where appropriate to the task(s), the system should provide a control to save the current-state information of the application such that the user may re-establish the saved state at an arbitrary future time. The system should not delete saved states when the user exits the application. When an application is used by multiple users, it should save current-state information for each user separately.

EXAMPLE 1 A user may wish to save a form that is partially filled, while going to another location in the application to find further information to use in completing the form.

EXAMPLE 2 A user may wish to quit using the application at the end of a day and to be able to return to the current state at the start of using the application at a future time.

#### 9.3.4 Go to previous state

If the user is allowed to save the state of an application:

— the restart of the application should be made to that state automatically, and/or

— the system should provide a control to allow the user to restart the application from that saved state.

When an application is used by multiple users, it should only allow a user to restart from the state saved by that user.

NOTE Where users are asked about saving states upon quitting, it is usual to ask users upon starting if they wish to restart from a saved state.

### 9.4 "Go to next"

#### 9.4.1 Go to next presentation segment within the application

Where appropriate to the task(s) and where the application is composed of a linear structure (or a structure that users might typically explore in a linear manner), the system may provide a control to immediately advance to the next (in terms of this linear order) presentation segment within the application.

NOTE The presentation segments involved often would be those identified in, and ordered by, an application's table of contents.

EXAMPLE 1 The user uses a "FORWARD" control on a Web browser.

EXAMPLE 2 The user uses a "next page" control to move to the next page of information within a tutorial.

#### 9.4.2 Go-to-next-media object within the composite-media object

Where appropriate to the task(s) and where there are a number of media objects that are sequentially related within a given composite-media object, the system should provide a control to immediately advance to the next media object or synchronized group of objects, within the composite media object.

EXAMPLE A "next clip" control will move the user to the next movie clip within a multi-clip sequence of movies.

### 9.5 "Go to end"

#### 9.5.1 Exit

If the user is allowed to end the application, the system should provide a control to allow the user to exit the application that is available at all times.

NOTE Exit can also be known as quit, close or off.

### 9.5.2 Go to end of composite-media object

Where appropriate to the task(s), the system should provide a control to move to the end of the current composite-media object.

NOTE 1 For media with direct access, e.g. digital media, laser disk and CD, a “Go to end” function is performed immediately.

NOTE 2 For other types of media, it can be realized by using a ”Forward” function until the end of the media is reached.

## 9.6 Determine current location

### 9.6.1 Location information

The system should provide users with information about where they are situated within the navigation structure and what their options are for navigation from the current location.

### 9.6.2 Identifying possible navigation pathways

Where appropriate to the task(s), the system should make a map of the navigation structure available to the user to help in evaluating possible navigation pathways.

EXAMPLE A map of the information categories is displayed as a tree diagram. The user can move to detailed parts of the map, and ultimately to a single item, by double clicking on a location.

NOTE Maps and diagrams of content structures help users browse and learn the conceptual organization of information.

### 9.6.3 Providing context for details

Where appropriate to the task(s), the system should provide a means for the user to obtain help to understand the context of the current content chunk.

EXAMPLE While maintaining an overview of the whole city, the user can see details of city streets in the specific location with a fisheye display that magnifies the local area.

## 9.7 Move

Where appropriate to the task(s), the system should allow the user to go to individually selected points in a composite-media object. The actual selection of these points by the user can be accomplished using

— links to predefined points, and/or

— a control (such as a slider) for identifying the relative position of the desired point within the stream.

## 9.8 Search

### 9.8.1 Search for other locations

Where appropriate to the task, the system should provide users with the ability to search for other locations that they might want to navigate to from the current location.

NOTE 1 The search capability can include the ability to allow users to save and revisit the results of previous searches.

NOTE 2 Content, that is not stored in textual form, can have textual tags added to it to increase the accessibility of the application to users with special needs.

NOTE 3 A search capability may enhance ease of use in situations of complex navigational structure.

#### 9.8.2 Helping formulate searches for items

The system should provide users with tools to help to define queries.

EXAMPLE To find an ISO standard, the user consults a thesaurus of design issues and terminology, picks keywords and synonyms from the thesaurus and submits them as a search.

#### 9.8.3 Accessing the results of a search

Search results should include links that provide access to items identified by the search.

EXAMPLE 1 The search results are presented as an alphabetical set of links.

EXAMPLE 2 The search results are presented as a prioritised set of links.

### 9.9 Tour

Where appropriate to the tasks, the system should provide a guided tour to help novice users to explore content.

EXAMPLE 1 The system suggests a sequence that the user should follow in order to navigate the content in the order of its historical development.

EXAMPLE 2 The system provides context-sensitive help.

## 10 Controls for coordination of multiple media

### 10.1 Synchronization of media

Where multiple media are synchronized as a composite media object, a single set of basic controls should be used to control all the media in a synchronized manner.

EXAMPLE The playing of an audio object is synchronized with the playing of a video object via the use of a single set of controls including: play, stop and pause.

### 10.2 Coordination of media

If a content chunk is presented simultaneously in multiple media, changes to one of the media should cause corresponding changes in other related media.

EXAMPLE Moving a cursor across a map changes the display of the corresponding address in a text box.

### 10.3 Controlling layered media

If multiple media used for a content chunk are overlapped or overlaid in a layered manner in order to reinforce each other, changes to one of the multiple overlaid media should be reflected in all layers of the overlaid media.

EXAMPLE Where graphical annotations are overlaid on a video, changing the size of the video presentation would also involve a corresponding change in the size and position of the overlaid annotation.

### 10.4 Separation of media

Where explicit separation of media objects is required by the users and/or the task, each separate media object should be provided with its own readily distinguishable set of controls.

EXAMPLE 1 Separate windows are used to help separate media objects and/or their associated controls from other media objects and/or their associated controls.

EXAMPLE 2 The user has a volume control to use while a composite media object, containing audio and video, continues to play.

### 10.5 Obscuring media

If a user's action obscures a dynamic media presentation, the system should provide the user with an indication of the status of the dynamic media presentation in accordance with ISO 9241-13.

EXAMPLE 1 An animated icon indicates that a video object is continuing to run.

EXAMPLE 2 The audio object can still be heard playing.

EXAMPLE 3 A changing-time indicator shows how far a video object has been advanced.

### 10.6 Navigating between media

When navigating between media, the links should be obvious.

## 11 Dynamic media

### 11.1 Dynamic-media controls

#### 11.1.1 Basic dynamic-media controls

If user interaction is required with a dynamic-media object or a composite-media object containing dynamic-media objects, the system should provide the user with a set of controls that include at least "Play" and "Stop".

#### 11.1.2 Access to dynamic-media controls

The system should allow the user to activate dynamic-media controls easily and quickly.

#### 11.1.3 "Play"

The "Play" control should be provided for all dynamic-media objects, or composite-media objects containing dynamic-media objects, to enable the user to start the presentation of dynamic media, except where the task requires automatic playing of the dynamic-media object(s).

Once "Play" has been activated.

a) The media object or composite-media object should start playing from its current position. There are two potential durations of play depending on whether a loop control (see 11.2.3) is available and active:

   1) If "Loop" is not active or not available, the presentation should stop at the end of the media object(s).

   2) If "Loop" is active, the presentation should continue to the end of the media object(s) and then restart.

b) The "Play" control should be made inactive.

c) If "Stop" is available, the stop control should be made active.

### 11.1.4 “Stop”

The “Stop” control should be provided for all dynamic-media objects, or composite-media objects containing dynamic media objects, to enable the user to stop the presentation of the dynamic media, except where the task requires automatic playing of the whole dynamic-media object(s).

Once “Stop” has been activated.

a) Playing of the dynamic media object or composite media object should immediately stop.

b) The media object or composite-media object should be repositioned to its beginning.

c) The inactive state of the media object(s) should be clearly indicated to the user.

   1) For visual media, a still image of the current position may be displayed.

   2) For audio media, either silence or a signal indicating its inactive state may be produced.

d) “Play” should be made active.

e) “Stop” should be made inactive.

### 11.1.5 “Pause”

“Pause” suspends media presentation to the user.

Once “Pause” has been activated.

a) Playing of the media object(s) should immediately stop.

b) The current position in the media sequence should be retained, so that the presentation can be restarted from that location.

c) The inactive state of the media should be clearly indicated to the user.

   1) For visual media, a still image of the current position may be displayed.

   2) For audio media, either silence or a signal indicating its inactive state may be produced.

d) “Play” should be made active.

e) “Stop” should be made active.

### 11.1.6 “Replay”

If replaying from the start of a composite-media object is required by the task, a “Replay” control should be provided that would incorporate both “Stop” and “Play”.

### 11.1.7 “Play backward”

When a ”Play backward” control is selected, a dynamic object, or composite-media object containing dynamic-media objects, should play in the backward direction.

If ”Play backward” has a separate control, it should be arranged at the left side and nearby to the ”Play” control which will be implemented as a “Play forward” control.

NOTE Playing backward can also be implemented using a “direction of play” attribute (see 11.2.2.1) with the “Play” control.

#### 11.1.8 “Scan forward”

Selecting a ”Scan forward" control should play the media forward with fast speed.

NOTE Where scanning is allowed only in the forward direction, the “Scan forward” control is often referred to as a “Scan” control, where the direction is understood rather than stated.

#### 11.1.9 “Scan backward”

Selecting a ”Scan backward” control should play the media backward with fast speed.

#### 11.1.10 “Fast forward”

Selecting a ”Fast forward" control should move the media forward with fast speed without playing it.

#### 11.1.11 “Rewind”

Selecting a ” Rewind” control should move the media backward with fast speed without playing it.

NOTE “Rewind” performs “Fast backward”.

#### 11.1.12 “Record”

Where required by the task, a “Record” control should be used to record/capture information from one source or a set of sources (e.g. microphone, camera ) to a destination (e.g. file on disk, tape).

The “record” control should be clearly differentiated from other media controls.

EXAMPLE 1 The record control is the only red control.

EXAMPLE 2 The record control is separated from the group of other media controls.

If appropriate to the task and if starting the recording function will overwrite an existing media (file), the user should first be asked for confirmation.

### 11.2 Attributes of controls for dynamic media

#### 11.2.1 Implementing attributes

Attributes may be implemented either

a) as separate controls, or

b) in combination with other media-control functions as compound controls.

#### 11.2.2 Direction of play

##### 11.2.2.1 Implementing direction of play

If playing backward is appropriate to the task and it is appropriate for a media object or a composite-media object to be played in reverse, as well as in the usual forward direction, the system should provide a “Direction of Play” attribute.

##### 11.2.2.2 Default direction of play

The default “Direction of Play” should always be forward.

### 11.2.3 “Loop”

Selecting “Loop” will influence the mode of playing certain media objects or composite media objects.

a) When “Loop” is active, the media object or composite-media object should be played in a circular fashion, replaying from the beginning when its end has been reached.

b) When “Loop” is not active, the media object or composite-media object should stop at its end and then the system should proceed to any further actions that might be linked to the end of playing that media object or composite-media object.

### 11.2.4 Controlling the speed of playing

If the tasks and/or the users require them, speed controls should be provided.

EXAMPLE 1 A shuttle control allows the user to determine the speed at which a composite media object is played, ranging from fast backward to fast forward.

EXAMPLE 2 The speed of playing is specified with a slider that controls speeds between stopped and fast forward.

### 11.2.5 Availability of audio controls

If audio is available, the system should allow the user to activate controls for volume attributes easily and quickly.

### 11.2.6 Set volume

It should always be easy to set the volume of audio in a multimedia application. Conflicts between software and hardware settings (e.g. raise volume by software, but hardware settings limit volume) should be avoided.

### 11.2.7 Mute

Selecting "Mute" should set the audio volume to zero. The system should allow the user to activate a mute function easily and quickly, so that the volume can be muted at any time.

The user should be given clear feedback on an active mute function.

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