

The Usability Reference Model

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I. The Model Ontology

(Content, portal, service, home-page are equivalent notions in usability discipline.)

Usability is the new and growing area of the ICT technology, the interactive system building. This model is basically intended to elaborate a *map of notions*, belonging to this area – in other words, to elaborate the ontology¹ of the usability discipline.

Our *map* recently is a simple *hierarchy*, as the OSI reference model is².

We divide the interactive information systems into *layers*, from the point of view of man-machine interaction. The main consideration to establish the boundary between *layers* is to identify the different areas of *technologies* and *responsibilities*, and demarcate them from each other.

Layers are as follows, upside down:

¹ Ontology primarily is for didactic purpose: the experts use the notions exactly, for understanding each other. The secondary purpose is technical, for designing methodologies: having ontology of the discipline on can design contents and software technologies to building the contents, dealing with the concerned discipline, much better, than without it. The final goal is the software quality: to build the ontology into the content or the software technologies to building the contents.

² It seems, already now, that we will need a more complicated map, represented with some kind of graphs.

0. Physical ergonomics layer

Ergonomics of display terminals, productional psychology.
Room illumination, height and angle of the table, of the screen, of the keyboard, etc.
Screen colors; refresh rate, mouse and keyboard ergonomics

Category: Profession independent.

Technology area: IT desktop hardware.

Responsibility area: interior designer, HW supplier

1. Perceivability (readability, audibility) layer

Resolution independency: information fits into the screen.
Color independency: no information only conveyed by colors
Localizations: language codes, number formats, datum formats
Screen management problems: text wrap, window scaling-positioning-overlapping, shifting-scrolling bars, data collisions, data visibility
Blinking problems: migraine and epilepsy avoiding
Dialogues to identify and authorize users
Printability, savability.
The accessibility technics work at this area.

Category: Profession independent.

Technology area (is or ought to be): operating systems, browsers, etc. Commerce elements of ICT software infrastructure

Responsibility area: IT infrastructure support

2. Navigability layer: low level operability

2.a)

The content elements can be reached, and operated manually. Moving inside element or between elements is obvious. Keyboard focus, mouse focus. Links are annotated by its prompts. No empty links. External links are approved periodically.

2.b)

Loadable files, software for using them.
Multimedia software, codec for time-based data.
Form-filling programs.

2.c)

Six sight concept compliance: Content sight, interface sight, setup sight, help sight, design sight, adsight are clearly distinguishable.

Content sight: data elements and the groups of elements connected together are recognizable and distinguishable - as the files and directories are in the traditional directories.

2.d)

Breadcrumbs.

Category: Profession independent.

Technology area: the low layers of the commerce content builder software technology.

Responsibility area: content builder technology or software development team

3) **Informatics' semantics layer**

In this layer the semantics of the content management technologies are presented and displayed.

3.a) Low level policy: Imprint, owner, support, goal, logo.

3.b) The function of all data element is evident, and annotated by some kind of the ontologies:

- function's (the professional independent part)
- user role's (the professional independent part)
- data management's
- gesture's
- support's
- type's
- life cycle's
- developer's

CLPBS-compliance.

Usable contents (not usual site map).

Category: Profession independent.

Technology area: content builder methodology, supplied by the custom-designed content.

Recently there is no commerce technology for this area.

Responsibility area: content builder technology or software development team

4) **Functional semantics' layer**

This is the lowest layer depending on the profession (on the speciality), the *content* deals with.

Semantic content table generating. Evident structure of the content.

- *Profession's (specialities') ontology*
- *User role's ontology*

Category: Profession **dependent**.

Technology area: content builder technology, semantics

Responsibility area: editors, senior editor, content builder manager, ontology expert

5) Content policy layer

There are obligatory or prohibited content elements, or other conditions to the content, as the format of the mail address, etc.

These are not in the 3.a) layer.

Category: Profession **dependent**.

Technology area: content builder methodology, supplied by the custom-designed content.

Recently there is no commerce technology for this area.

Responsibility area: senior editor, editors

6) Synopsis layer

Domain management

Global identity management

Maintenance. Technical support and user communication.

Category: Profession independent.

Technology area: internet technologies. ICANN, etc

Responsibility area: support

II. The conceptual correctness of user interfaces

The conceptual correctness means, that at the screen – or even ergo in the whole content/service - the every seeing has its category, function. The next taxonomy and methodology, elaborated in this chapter is an example, how to fix this issue.

Definition: **IConS-item** (or item) is

- a) any element of the content/service, consisting of closely related information, ex. file (text, sound,...), information, dialog element ex. menu element, form to fill, etc.
- b) group of *IConS-item*, ex. directory of files, a whole menu, a set of pages, connected by some point of view,
- c) the connections among them.

So *IConS-items* cover all the things we can see at the screen, and consequently all the things being in the content/service.

II.1. The 5 sights concept

The *IConS-items* can be grouped into 5 categories:

1. *Content's* sight – everything, concerned to the scope the content/service deals with, that is the profession.
2. *User interface's* sight – every widget, pull down menu, etc., to manipulate the Content or Content's sight.
3. *Setup's* sight - every widget to manipulate User interface.
4. *Design* – every things, only for seeing and without other function. The designed, artistic widgets, icons having function, belong to previous 1-3.
5. *Ads* – are out of the scope of previous things.

All the 5 categories are to be distinguished easily, unmistakably by eyes – it is the scope of the ergonomic domain of the IConS concept.

II.2. The annotations

Concerning the semantic domain, the all sights on the screen – but at least, of 1-2-3 categories - are to be annotated by keywords of their own ontology. The ontology is counted in recent study as a dictionary of keywords (notions) of at most 2-3 level, and the relations among the notions.

The annotation may be:

Unary – Establishes the features of the *IConS-item* by keywords. Examples: [text, picture,..]

Binary – Establishes a relation between 2 *IConS-items*. Examples of asymmetric relations: [cause-consequence, precedence-subsequence, explanation_of-application_of, ..]

Ternary and higher - ...

The keyword may be of 1st level: [picture,..], of 2nd level: [picture.[graphics, design, photo,...],..]

The next sketch shows a possible philosophy of the ontology structure:

1. Content's sight *items* are annotated by

Profession's ontology – Profession is the area the content/service deals with. Ex. keywords of government, health-care, taxation, traffic, sailing, etc.

User role's ontology – marks the user role, *items* is assigned to.

Function's ontology – The role of the *item* in the content/service.

2. User interface's sight *items* are annotated by

Data management's ontology – Describes the notions of the operation, can be done with *item*.

Gesture's ontology - fixes the notions connected with the user interfaces' *items*.

3. Setup's sight

Gestures ontology - the notions connected with the user interfaces' *items*.

Support's ontology - Describes the communications important for the support of the content/service. (It may also be counted as the annotation of a special - the 6th - sight: the imprint sight or brand sight.)

All sights (there may exist ontology, applied to 1,2,3 sights)

Type's ontology - Describes the type of *items*.

Life cycle's ontology – Marks the phase the life cycle the *item* is in.

There are two main types of ontologies: **fixed**, connected with informatics, and **variable**, connected with and concerning to the profession. Root level of used ontologies can be as follows:

II.3. Ontologies

User role's ontology

The user roles may be:[support, data owner, content/service builder, data operator (manager), auditor, moderator, author, (authorized) user categories of the *profession role*, client categories of the *profession role*, guest categories of the *profession role*,..]

The 1st part of the list is *fixed*; the lasts - connected to the *profession role's ontology* - *vares*.

Profession role's ontology

Connected with the duties of the profession in question: [official, chief, controller, client, customer, auditor, chief-employee,...]. It is **bounded** to the *User role's ontology*. *Varies*.

Function's ontology

The function of an *item* can be: [definition, statement, assertion, question, example of.., form.[to fill, being filled, filled], digest of.., text.[authorized, non/authorized], picture.[photo, design, graphics, ..], cause-consequence, precedence-subsequence, explanation_of-application_of, question-answer,...]

Fixed or can *vary* in some details.

Profession's ontology Varies.

Data management's ontology

The functions of a [read, create, modify, group, ungroup, delete, send, rename, move, annotate, compare, synchronize, upgrade,...] *Fixed*.

Gestures' ontology

It can be counted as the product (or concatenation?) of sub-ontologies:

User interface's ontology: [positioning interfaces (ex. roll of text), operational interfaces (generally menu-elements), ..] *fixed*.

Clicks' ontology. It annotates only the clickable *item* of the screen: [command.[of kind of some previous ontology..], link.[to inside the content, to outside the content, to help.[of kind of some previous ontology..],..],...]. **This ontology turns the usual hyper links to Semantic links or annotated links.** *Fixed*

Support's ontology

[background contractions, messages.[fatal, error, warning, information], addressee.[user ontology], content's IPR, hot line services,...] *fixed*.

Type's ontology

Type of *items* may be [simple, compound.[2d_matrix, 3d_matrix, graph,..],..]. Menu is 2d_matrix, contents is graph, etc. *Fixed*.

Life cycle's ontology

[concept_planning, technical_planning, implementing, testing, turning_to_live, content_building, using, maintenance] *fixed*

Developer's ontology

It is connected to the *Developer's ontology* [sponsor, designer, architect, programmer, advanced user, system manager,...]. Annotation may be used for technical documentation. *Fixed.*

There are 2 ontologies pertaining to the professional content itself: the *profession's* and the *profession role's ontology*. They are managed, upgraded at *data operator role* (in the *user role's ontology*). The other ontologies, pertaining to IConS software, are mainly fixed, updated at *support role* (in the *user role's ontology*).

The IConS content/service may use **standard**, commerce ontologies, whether they are bought, whether are developed.

II.4. Example: The ontology of the the authorization

It works over the *data management's* and the *user role's ontologies*. The Authorization Database is a standard element in all IConS content. It is

- '2d_matrix' in the *type's ontology*, dimensions are *User role's ontology X IConS_items*. The matrix elements are from *Data management's ontology*, showing what can be done with an *item* by a role.
- allowed to 'modify' (see *Data management's ontology*) by the 'content/service builder' role of the *User role's ontology*,
- allowed to 'read' by the 'auditor', etc.

II.5. Why are all these for?

The semantics help the *roles* to communicate exactly on the e-service during its whole life-cycle:

a) Conceptually established system planning

- At the very beginning, in the 'conception making' phase (see *Life cycle's ontology*) the 'designer' (see *Developer's ontology*) has to make the *Profession role's ontology*, and to bind it to the *User role's ontology* as a part of the conception plan.
- In the 'technical planning' phase the 'designer' makes or purchases the *Profession's ontology*.

b) Role-missing avoidance

(The **role-missing** is one of the most disturbing effect of recent software technologies: the 'user' is given an information concerning the 'system operator', *without understanding that it concerns to somebody else, so being mislead* – and the 'system operator', however, is not informed.)

- The ‘designer’ and ‘programmer’ are made think exactly and construct, annotate the *IConS-items* obviously. Every role needs its own information.
- The ‘content_builder’ role will be separated exactly from the previous ‘designer’, ‘programmer’, ‘architect’, etc. roles.
- In the ‘using’ phase the meaning of an *item* in the content/service is obvious. The annotations can be seen by some roles of users.
- The ‘audit’ functions will be clear, unambiguous.

c) Semantic content table generation

(The lack of the conceptually correct content table, without omission and redundancy is the other disturbing effects of the professional services.)

- The ability to **generate semantic based content tables** or site maps arises. It can be made interactively, even by any ‘user’.

All these make up a new content design philosophy, called IConS methodology. This formal, conceptually exact semantic way is a demand in professional world, and not in popular world.