Retrieval and reference

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5 RETRIEVAL AND REFERENCE

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Knowledge from study may be transferred in different ways: in words and images, via lectures and exhibitions, in the form of articles or books; and electronically.

For the time being, the form used most frequently is written publication in text and illustration. However publishing on CD-ROM and the Internet are witnessing rapid development. Maybe this is going to have important consequences for the way in which people are searching for information. In this contribution we discuss some points needing attention for optimal accessibility of knowledge from study and suitably dealing with the sources used. We refer to handbooks for the conventional playing rules of reporting in writing such as clear and interest evoking titles of chapters and paragraphs, clear structure and table of contents, avoiding unnecessary jargon, a clear summary and their like.[a,b] The emphasis in this Chapter is on adequate pointers to references and the use of key-words.

Before embarking, first, something about the way to stimulate potential readers to take notice of the information. It starts already with the cover and the titlepage. These give a first impression of what is waiting for the potential reader. With this author, text or images present themselves. One glance should make clear what the subject is; although it is sometimes attractive to confuse the reader. Starting from cover and title page, the reference data (copyright notice, year of publication, ISBN number, place of issue and publisher), table of contents, foreword (written by a recommending outsider or referee) and introduction, the reader is introduced from his own world into the world of the author. The author and those responsible for the lay-out should picture themselves in this process and shape the publication from the vantage point of potential readers (the target audience), their questions, their pre-suppositions, or lack thereof.

Possible pre-suppositions of the reader should be supplemented or corrected. With this it is prevented that potential readers are thinking after a while "What the hell is this?" A clear text on the back cover, an index of key-words, a list of references and a sensible use of footnotes and final-notes are important conditions as well in order to achieve a publication that invites reading.

5.1 REFERENCES

Reference to texts, illustrations or electronic publications is an important condition for the possibility of judging a publication. To the reader it is an indication of the degree to which the discourse of the author is supported by insight from other sources, or checked against them. Referencing employs key-words. The name of the authors and year of publication are the most important ones. With these two data: for instance (Jong, de and Van der Voordt, 2002) the text of a publication usually refers to a list of literature or a reference list in the final part of the publication: it is a citation. At that spot more key-words per publication should be provided in order to enable the reader locating it in a library or ordering it in a bookshop. For architecture, images and electronic publications are greatly important, so that 'References' should rather be used as a term than 'Literature'. This chapter is usually not numbered along with the chapters of content, although just on conventional, not rational grounds.

List of references

The place of issue, the name of the publisher, the ISBN number and possibly the web address (URL) are important key-words in order to find the publication. If these have been left out in the referral data or in the list of references, the potential reader is de-motivated to look for the publication and consult it himself. When one, for instance, wants to point at this article (Jong, T.M. de and D.J.M. van der Voordt, 2002) this can be done by including in the reference list the following data:

a   Elling, R.B., B. Andeweg et al. (1994) *Rapportagetechniek. Schrijven voor lezers met weinig tijd.* Tips and tools for writing reports, feasability studies, procedures and so on, particularly focussing on technical and business administration education.

b   Blokzijl, W.J. (2001) *Schriftelijk rapporteren voor bouwkunde.*

Book section:

Jong, T.M. de and D.J.M van der Voordt (2002) *Retrieval and Reference* in: Jong, T.M. de and D.J.M. van der Voordt; eds. (2002) Ways to study and research urban, architectural and technical design (Delft) Delft University Press.

Edited book:

Jong, T.M. de and D.J.M. van der Voordt; eds. (2002) *Ways to study and research urban, architectural and technical design* (Delft) Delft University Press.

Time and place have here been bracketed and are separating in this way clearly authors, title and publisher. This reference has been made with the computer programme Endnote. This database programme is popular in academic circles and used in Maastricht, Rotterdam and other places. It is plugged in in the word processor, and is maintaining all references, preserves them for future publications, provides access to the literature databases on the Internet and edits them according to any desired lay-out (different for each author or publisher) of the reference list in the document processed.

Making a personal database

The present list of reference was made first in Excel, and then exported[a] to Endnote. It is recommended to start a personal list of books and articles, read or consulted, from the start of a study and to maintain it, keeping it up-to-date. It does not only serve recollection of what has been read; it is also lowering the threshold of referring to others when reporting. In Excel the list looks as showed in the enclosed table.

Per publication (row) 30 data may be stored, e.g. number of pages, ISBN-number, abstract, key-words, notes and so on. They need not all to be taken up into the list of literature of a book or article to make the reader find the publication. They are of especially good service in electronic retrieval, if they have been filled in correctly. It is not always necessary to fill in all columns. However, it is important that this possibility remains open. It may also be used collectively.[b] Some staff members of the Faculty of Architecture of TUD ordering a book are supplying key-words with which the content of the book may be characterised according to him. These are added to the list, with the name of this reviewer and are made available to students of certain modules of the curriculum. If they find a title, they may ask the staff member with this title on his shelves: 'Is this a publication answering my question?'

Filling in a list like this requires following some conventions in order to come to a consistent list of literature, so that a computer programme can do its work later. Names of the authors or editors that wrote or edited a publication should be separated from one another by a semicolon (;). One mentions first the surname of the author, without prefixes (like 'Van der') and after a comma (,) the Christian names or initials with prefixes (see the example given).

Different reference types

The first row of the preceding list contains standard fieldnames a computer programme can recognise. In database jargon each next row is a record (a document card in a box) with 30 fields (data on each card).[c] The first field is each time the reference type (a book, book section, edited book, article in a magazine, conference proceeding, etc.) In the example two reference types have been used. In the first row (record) the first field reads 'Book Section'. This is an article in a book with articles by different authors, put together by editors (listed under 'Secondary Author'). In the second row an 'Edited Book' is listed. Herein the editors are included as 'Author'. In the literature list they can be recognised as editors by the added 'ed.'. A computer programme such as Endnote adds this automatically to an Edited Book, but not to a reference type 'Book'. This type has just one author, unless his book is part of a series with series' editor. In that case this editor is mentioned in the column 'Secondary Au-

Reference Type	Book Section	Edited Book
Author	Jong, T. M., de; Voordt, D.J.M. van der	Jong, T. M., de; Voordt, D.J.M. van der
Year	2002	2002
Title	Retrieval and reference	Ways to study and research
Secondary Author	Jong, T. M., de; Voordt, D.J.M. van der	'
Secondary Title	Ways to study and research	'
Place Published	Delft	Delft
Publisher	Delft University Press	Delft University Press
Volume	'	'
Number of Volumes	'	'

26 Conventions of reference according to Endnote

a Excel files may be translated in text-files (.txt) with tabs and may be 'imported' along these lines to practically all database programmes. Endnote only needs adding one line with the word 'Generic' at the start of such a textual file.
b On the Faculty of Architecture of Delft University of Technology such a list of some 1300 titles used in education (also in the first years) is available; occasionally with as many as 100 'key-words' per title.
c In a database stored as a textual file (.txt) the fields are usually separated with tabs, while each record starts on a new line.

thor'. If an Edited Book is part of a series with a series' editor, he is mentioned in a field 'Tertiary Author'.

Endnote can distinguish sixteen reference types with their own lay-out requirements: Journal Article, Book, Book Section, Edited Book, Magazine Article, Newspaper Article, Conference Proceedings, Thesis, Personal Communication, Computer Programme, Report, Map, Audiovisual Material, Artwork, Patent and Electronic Source. Also to those who do not use Endnote, it is important to be aware of these differences. Each reference type uses in a different way the available fields. This way, in the case of Conference Proceedings the name of the conference is mentioned in the field 'Secondary Title' and the venue in the field 'Place Published'. Each publisher has his own conventions for making the literature list. A considerable number of these lay-out conventions is digitally available in Endnote and on the Internet.

Article and publication

A published book also mentions an ISBN number: a sequence of 10 digits ordered in 4 groups. The publisher (407 is Delft University Press) and his language (90 is Dutch) may be derived from it. If the ISBN number starts with a 0 or 1, it is an Anglo-American publisher (3, 4 and 9942 are respectively German, French and Surinam publishers, regardless of the language they are publishing). The final digit is a control digit. Remaining digits are provided for the publisher and the numbering given to the publications himself. A programme like Endnote can not mention ISBN numbers in Book Sections. Therefore, it makes sense to enter the Edited Book as a whole on its own separately. One must select then between key-words of all separate articles. If one is referring to different articles separately, it is superfluous to indicate all the time the data of the publication in which they appeared; furthermore, the articles may be found via key-words immediately.

Many key-words

A few key-words per publication is insufficient nowadays. In a library a search for publications can be carried out using author, title, and a few other reference words. This seldom produces the content required. Edited Books, sometimes extremely important for students, are often characterised by a few reference words.

These reference words characterise the whole book, but do not refer to a useful chapter, for anyone especially a lay-person, which summarises the whole field of study. When carrying out a search in a library, one very quickly chances upon extensive standard books for this field of study, which as a first point of contact with the subject for a lay-person is too complex. Architecture does not have an unambiguous nomenclature which in Chemistry, for example, makes searching pleasurable. This problem is intensified when carrying out a search for images (Maps, Artwork) that are of significant importance for Architecture. An image can say more than a thousand words, but which words are these? Very often an image can portray a tremendous number of concepts in mutual relation (see page 36). It is almost impossible to characterise them using singular reference words. A method invented for this is the Faculty of Architecture's Interactive Image Archive (IAAI, see page 49), which, in time, will also enable texts to be retrieved in a more goal-orientated manner. This method is inspired by formal logic (sentence functions) and the mathematical concept of function a simplified manner. (See page 40 and 225).

5.2   REGISTER OF KEY-WORDS

The last chapter of a book or its end is ideally a complete alphabetical list of key-words for its contents (list of key-words, register, index). Although not usual, a register like that would be quite appropriate for an article as well. Since a register per key-word is pointing to consecutive pages where the key-word is occurring, it is a good author's habit to give in the case of a first occurrence of a professional term in the text its most important definition, description or context. This provides the best possible link to the experiential world of the reader, by

giving first a description and only then (between brackets) the professional term. This may be done unobtrusively, without cumbersome sentences 'defining in passing', for instance:

'In this series of drawings one sees a process of increasing accumulation of the built environment (concentration).'

'Concentration' is here the key-word to which the index refers. After such a phrasing, this shorter professional term can be used, since the index is referring the reader directly to the first page where the term is used. If all is well, the context (built environment), description or definition (process of increasing accumulation) is given there.

Not sub-dividing list of key-words

By including on a standing basis the index in the final pages of the publication the reader may intuitively find it at once. State-of-the-art word processors are putting together an index like that automatically when one marks the words concerned in the publications an index word and mark the place where the list should be generated. In the present text the marked key-words are printed with a wide spacing, except in the head-lines. An index is an alphabetical gate to the publication, the table of contents is a systematic one. Therefore it is not logical to make in the alphabetical list of key-words a distinction between a 'register of persons' and a 'register of subjects'. This complicates retrieval without necessity. Since the word processor can assist us in this regard, it is worth the effort to mark author's names, as well for the index, even if they have been collected already in the list of references. This allows the reader to readily return to where he or she has been reading about a given author. An author's name can be used as a label for a line of thought. There is a lot to say for including in the index in addition to key-words and (place) names also crucial adjectives and verbs or words in a different language. These words may be integrated in alphabetical sequence in the index. By the same token it is superfluous to make, for instance, a separate register of English or Latin terms. Let it not be forgotten also, to make images retrievable with key-words; so give each illustration a title with crucial key-words to which the index can point. The word processor can also produce a separate list of illustrations; useful if provenance has to be acknowledged in terms of intellectual property and copyright.

Headings

The table of contents with its pagination in the beginning of the book or article gives systematical entrance to the publication and can contain the central key-words in their context (the headings). This table of contents can be generated in a word processor automatically with any desirable number of levels (chapters, paragraphs, sub-paragraphs), if the chapter and paragraph titles are head-marked at the right level (heading 1, 2, 3). Do not exceed 3 numbered levels and use logically decreasing letter sizes (like 16, 14 and 12 point). Headings should assist the reader in navigating through the publication, should arouse curiosity in the text and represent its content in crucial key-words. In the rules already marked for the table of contents as a heading, the key-words can not be marked once again for the index. After the heading one should return to that key-word in the text, in order to be able to mark it for the index. By starting a paragraph by explaining the heading in different words, legibility is enhanced; especially desirable when the rule is followed that a heading may never exceed one line. When the heading is a good rendering of the content, the table of contents is a concise survey of the proceeding of the discourse. When the table of contents is regarded this way, the line of discourse may show up in a reversed way.

Combined key-words

Next to author and year of publication the title is the third important key-word allowing retrieval of a publication. We talk here deliberately of a 'key-word', although the title of a publication is usually composed of more than one word. In this contribution we recommend key-

words comprising several words, since the number of professional publications has increased the previous century to such an extent, that just one single word is pointing to too many publications for convenient retrieval. That is quite clear on the Internet. Just type the word 'building' and one is faced by the task of visiting some 30.000.000 sites. Search engines allow connecting words to the logical terms 'AND', 'OR', 'NOT' or 'NEAR'. The disadvantage of single key-words is that they can not transfer relations between concepts even with those tools, while they are the essence of a scientific document. So see to it, that the most important relations addressed by the publication may be recognised in title and headings and possibly in matching illustrations. Two illustrations next to one another may clarify effectively by their differences and similarities what can be hardly expressed in words. For that purpose poetical means and ambiguous evocative use of language or images is also used. Although this might be functional, it is loosing its aim if it does not connect to the pre-suppositions of the potential user.

Choosing key-words

Making a text retrievable begins by marking reference words which touch on the very core of the matter in question and may be chosen, at some point, when carrying out a search. This must not be limited to substantive nouns. Names of places, persons, adjectives, verbs and even dates can often fulfil an excellent rôle when searching for a text or an image. Articles, conjunctions and prepositions must not be marked, unless these change the meaning of adjacently situated words significantly. Imagine that, in the text fragment below[a], the following reference words have been marked with a marker or by the word processor for the index:

'If you ask a constructor what a hybrid bearing construction is, then he will reply with definitions which have nothing to do with the hybrid character of buildings. Because hybrid load bearing constructions are, according to constructors' definitions, just load bearing constructions that include different construction systems or various materials.'

This provides the following register (using the sortfunction in the word processor if required)

- *Construction systems*
- *Load bearing constructions*
- *Hybrid*
- *Materials*

Compiling key-words

The relationships between these concepts can be expressed partially by re-arranging the words and coupling some groups to one reference word. A classical way of doing this is the hyphen (-), as used in 'Zuid-Holland'. The hyphen also keeps the compiled terms together during electronic selection in an index. This is different with the concept of 'hybrid load bearing construction'. These four words must be considered as one concept with its own meaning, but are separated in the case of alphabetical selection and than loose their meaning.

It is standard practice in the world of computers to replace spaces with an underscore (_): hybrid_load_bearing_constructions. Due to this, reference words, which are of no use as searching terms, are not split into three reference words when placed in alphabetical order or when read by a computer:

- *Construction_systems*
- *Hybrid_load_bearing_constructions*
- *Materials*

The question is, will the term hybrid actually be used in order to search the section stated? If it is thought that the passage will more readily be sought using the term 'load bearing' constructions, load_bearing_construction_hybrid can also be used.

a   Weeren, K. van (1999) *Hybride gebouwen en hybride draagconstructies*.

Syntactic connection

Most relationships, when attempted to be conveyed using a scientific text or an image, are not relationships within concepts or variables; they actually lie in between. These relationships are seldom symmetrical: there is a primary active variable (independent variable) (x) and resulting from this a passive (dependent variable) (y), an input and an output, a cause and a consequence, but also a condition and a possibility created through this, such as insulation and internal temperature, columns and beams.

Colloquial language almost always establishes such a relationship in the syntax of a sentence with an active subject, (who or what does what?) a predicate, (what is being done?) and a passive direct object (who or what undergoes the action?) In formal logic, such a sentence is abbreviated to a sentence function: $y(x)$. See also page 40 and 225 This can be interpreted as: y as an action or working of x. This abbreviated representation is suitable for use as a reference word, when the bracket is used as a special syntactic coupling symbol and all spaces are omitted: direct object(subject). Van Weeren's text can therefore be represented as follows:

load bearing construction(hybrid construction system and material).

The load bearing construction is determined by the hybrid construction system and material, not the reverse, expressed as:

construction system and material(hybrid loadbearing construction).

This would imply that the construction system and material could have been chosen as a consequence of hybrid uses of the load bearing construction. If both are to be considered (inter-action) then both have to be mentioned as a key-word.

'Nested' summaries

A representation of A as an action of B as an action of C, A(B(C)), is known as 'nesting' in the world of computer programming. Van Weeren continues his text using an example from the municipality of Zoetermeer.

'Hybrid load bearing construction: furniture mall Zoetermeer

The Furniture mall in Zoetermeer can probably be called a hybrid building. The building is used for three different functions: basement parking, large-scale shopping areas above, and above this, residential housing. Co-incidentally, here too, hybrid constructions are present, but they have little to do with the fact that there are different functions in the building. At the entrance, in one singular detail different construction elements come together: a pre-fabricated concrete column, a pre-fabricated concrete beam, a steel beam and a steel column with an special form, covered by a pre-fabricated floor, which in some areas is extended with concrete floor segments which were poured on-site.

The fact that steel, on-site poured concrete and pre-fabricated concrete are inter-mingled with each other has nothing to do with the hybrid character of the building. This is just a consequence of insufficient space below the ceiling. The (cheap!) pre-fabricated concrete construction system did not generate enough space. Therefore, an on-site change to an integrated steel beam in the floor was implemented. It was also impossible to realise the required form of floor finish using (cheap) pre-fabricated concrete; this however was possible using on-site poured concrete.

Construction costs are a major factor for the design, especially with projects such as a furniture mall. This is even more so for the load bearing structure. The floors account for most of the cost of the load bearing construction. An unbeatable alternative in the area of floors in this situation is pre-fabricated concrete hollow core slabs. These elements cost Dfl. 70.— per m^2 for a span of approx. 7m, which was implemented in this case, with total construction costs of around Dfl.2000.— per m^2. If a form cannot be constructed in one go, with this material (rec-

tangular slabs), then the special segments of the form are created using on-site poured *concrete. This hybrid is* cheaper *than opting for a total system which could be manufactured in the form desired.'*

This relatively compact text can be summarised using three reference words. The actions within actions are made explicit using 'nesting'.

furniture mall(parking, sales area(furniture), housing, entrance(pre-fabricated versus on site pouring), Zoetermeer)

pre-fabricated(concrete(column, beam, floor(hollow core slabs, costs, steel(girder))

on site poured(floor segment(lack of space(ceiling versus floors), floor finish form), costs)

In the index, the content of this book is retrievable this way.

The syntax of a text

Research proposals can be analysed in this way. Using the reference words of such a text could be more efficiently and concisely re-written and contextually assessed. It could then be seen at a glance if too many, too few or too complex (multiple nested) relationships are made and how operational they are for research (computable, measurable). In the interim reports, analysed in the same way, new relationships can be involved in the research and others removed. One can also train oneself in making notes and making summaries of the readings. In the future intelligent linguistic databases will be created, which can comprehend 'summaries' such as these. Besides this, the content of a record could be represented as follows:

*Recordname(fieldname1(fieldcontents), fieldname2(fieldcontents)...)*

The most important area of application and also the reason to change to syntactically compiled key-words is the problem of the retrievabliltiy of images.

5.3 IMAGE SEARCH ON INTERNET

The Internet is the largest image archive in existence. The images are inexpensive, quickly retrievable from any location, sometimes in motion (animated GIF) and mostly in colour. Animated gifs are excellent for placing transparencies over a drawing in order to show alternating images: all locations remain at the same place, therefore, no-one has to overcome any locational comparability problems. However, internet images are coarse (the screen representation varies from 72 dots per inch (dpi) to extremely rough images (quick loading thumbnails), or they cost too much download time (for high resolution images). The Saariste website,[a] for example, gives numerous photos of historical architectural examples per architect. High quality photos can be ordered via the site. Many architectural offices have a similar website[b] from which simple images of their work can be downloaded directly from the web (refer to source and web site!) and used in a word processor or a drawing programme.

These coarse images are only suitable for printing small images. Line drawings without filled-in colour areas are often not very clear. It is possible to obtain drawings as CAD-files (DXF-format or otherwise) from the web.[c] This is not a raster file, but a vector file with an unlimited zoom focus, which can easily be edited personally.

The Architecture Faculty building[d] in Delft, for example, can be obtained from the web in layers for educational purposes. In order to do this you need a special programme on your computer (a plug-in). The global map of the Netherlands can also be downloaded in many layers and in various file formats without using a plug-in.[e] If you have access to a drawing programme such as CAD, Corel Draw or Adobe Illustrator, this can be used to compile various layers, colour, cut out details and, if necessary, re-convert into a raster file which can then be used in a written report using a word processor.
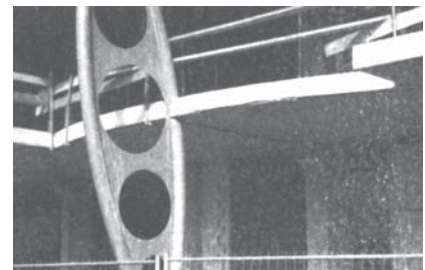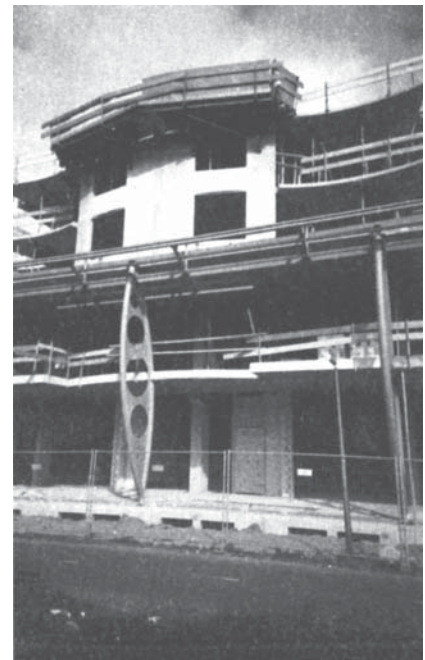
27 Shopping mall in Zoetermeer, under construction; entrance and construction detail

a   http://www.bk.tudelft.nl/d-arch/agram/
b   http://www.architectenwerk.nl
    http://www.archined.nl, http://www.luna.nl/~xino/
c   http://www.greatbuildings.com
d   http://www.bk.tudelft.nl/users/barendse/internet/
    onderwijs/bk_dwgf_2d/bk_dwg_2d_frm.htm
e   http://www.ai.bk.tudelft.nl/projects/data/top_data.html

Research shows that Internet users become depressed due to the sheer volume. The main problem of this medium is the search function. The images are poorly documented and therefore difficult to retrieve using scientific image properties. Image recognition using colour and global composition is possible;[a] image recognition by means of architectural structure is still in its infancy.[b] The Interactive Image Archive is dealt with below in order to give insight into which image characteristics are of primary importance as reference words in order to enable image retrieval.

Image and image characteristics

The TU Delft's Faculty of Architecture has developed an Interactive Image Archive (IAAI), the purpose of which is to store images using scientific characteristics and in doing this making the images retrievable for students, graduates and researchers. It comprises a decentral input programme and a central programme for data processing and output to the Internet.[c] In future development the 100 best documented and the 100 most consulted images will be automatically shown on the Internet site.[d]

A committee then chooses monthly the scientifically or esthically best for a top ten which serves as a homepage. When one of these images is clicked upon, an enlarged image appears with many key-words. These reference words can be clicked on in order to show the images (small images), which comply with that characteristic. These thumbnails are also 'clickable' which shows enlarged images with reference words etc.

Not every image has an equally good provision of reference words. This depends on the individual effort of suppliers (students and researchers) at the time of input. The input programme is for Architecture students (ca. 3000) and staff (ca. 300) and can be downloaded from the stated website using every computer within the faculty. The image, to be entered from the computer, is shown and a series of questions is asked, both scientifically relevant as image characteristics, from construction drawing to regional plan. Not all reference words are required to be filled in. Student number or log-in name, authors name, frame and grain (scale) are compulsory, and location, if possible. The date is automatically recorded. The Faculty of Architecture is considered as the copyright publisher and the place of publication is Delft. At the end, the opportunity is given to enter free, syntactically compiled reference words, possibly using simultaneously provided professors' much used terminology or those of the Faculty library. The input programme sends the data to a personal server space of 50Mb, which is allocated to each student and to the central data processor, which continually compiles the Internet page.

Scale

One of the most powerful search functions for images in the IAAI is scale. Scale indications such as '1:1000' are dependent on the paper format when determining what is readable. This is why for computer images the radius of the 'frame' and the 'grain' (see also page 210) of the image replace these usual indications. The radius of the frame means the smallest circle described (from the series 1,3,10,30…mm, m, or km, see page 37) which the image portrayed can contain in every direction or the largest registered circle within the boundaries of the image. The radius of the grain means the radius of a described circle (in the same series) that could in reality contain the smallest detail readable from the image. The relationship between grain and frame determines whether the image concerns a contract drawing (grain/frame = 0.001), a sketch plan (0.01), or a rough draft (0.1). When choosing grain and/or frame the search assignment can not only be limited to construction drawings, architectural or urban development drawings from the archive, but within this, distinctions can be made between rough drafts, sketch plans, final designs or contract drawings.

a   http://disney.ctr.columbia.edu/WebSEEk/
b   http://www.bk.tudelft.nl/Informatica/koutamanis/
      onderwijs/index.html
c   http://ai.bk.tudelft.nl/
d   http://ai.bk.tudelft.nl/

Location, concept and perspective

If during the input into the IAAI, geographical co-ordinates or postcodes have been entered, the location is automatically mapped on the Internet site. A location on the map of the Netherlands can then be clicked on, in the IAAI website. The output programme then shows every entered project situated at this location. In time this map can be 'filled' with three-dimensional CAD drawings, which can be zoomed in upon, into the actual rooms. In this way within a few years the Netherlands will be virtually transformed by the designers of the 21st century into a sort of flight simulator scenery.

Some locations are popular for many projects resulting in an overlap of designs in this landscape. The total image must then be limited to a specific future perspective.[a] For example, one may only wish to view designs which are intended for the context of shrinking European Economy, a steering national government, a traditionally orientated local culture, etc. The input required for this per image, must place the image in one context (everything which falls outside the framework and structure) and in a future perspective (see diagram on page 38).

This is not only important for such selections in futuristic spectacular computer applications; it also has crucial functions for utilisation and supply of an image archive. When nothing is known about the context and the perspective in which an image has been placed, the external effects cannot be assessed, it is taken out of context and is mostly of no other use than inspiration. A design may fit in and function in a particular context, and not in another. The image supplier, usually the designer, is, therefore, requested during the input programme to enter the intended functional period for the image portrayed (plan horizon) and which perspectives per scale level it provides as probable future (see page 7).

This awareness appears to have a high educational value and aids systematic creation of a graduation thesis. If, on the other hand, the user or assessor has totally different perspectives regarding the probable future, this does not automatically mean that this will be judged as a poor assessment, if the designer has explicitly stated his perspectives. In turn, the assessor is challenged, to make future pre-suppositions explicit and to compare this with what the designer or researcher had in mind outside the design. Subsequently it can be assessed as to whether the design in various perspectives of various assessors holds its ground or not, therefore allowing the 'robustness' to be determined for various scenarios.

Readability

Various actors in the construction process want to be able to read various effects (environmental, ecological, technical, economical, cultural and administrative) using the design drawing. Images are sought in which these effects are 'readable'. The majority of effects are only readable within a specific context and in a well-described perspective.

Only when such questions have been answered, can questions be asked regarding the effects, which in that specific context and from that perspective can be read from the drawing or image. In the input programme of the IAAI the diagram on page 38 is used. Which effects are precisely readable is not asked, but of which nature (environmental, ecological, technical, economical, cultural, administrative) and scale (1,3,10,30…. mm, m, km) their action is.

Distinction is made between intended and unintended effects. The intended effects are desired by definition, they contain (if present) the programme. The unintended effects may be desirable and undesirable. The unintended effects cannot all play a rôle in the designing, however the image producer can involve them in the accountability of his design in retrospect. It is only of a scientific interest to specify by scale and nature in advance, even though they do not yet play a rôle in the designing. The awareness of such effects is important when choosing participants in the construction process and for references during research.

a   It is requested that within the plan horizon and per scale level the environmental (concentration<>deconcentration), ecological (homogenous<>heteregenous), technical (combination<>specialisation), economic (shrinking<>expanding), cultural (tradition<>experimentally directed) and administrative (directive<>following) perspectives are specified. They are noted as syntactically compiled reference words.

5.4   REFEREES

Texts and images get a scientific status when they are actively exposed to the possibly refuting judgement of experts outside the personal circle (referees). This is pre-supposing in any case that they can be judged; in its turn this is pre-supposing that they can be found again. With images pretending at any moment a possible future (designs) this potential to be judged presents a problem that may be partly solved by making the context, perspective and demonstrable effects on the presented (future) image explicit. The designer should actively start searching critical referees. One who is not interested in criticism and critique is not fit for scholarship. To the student this is the teacher or researcher recognised as a judge for a certain professional area by his appointment; possibly within the Faculty itself. For the university researcher this is someone outside his own university. Up to now editorial boards of highly regarded journal or publishers are catering for such a judgement (peer review). With the rise of the Internet, Internet-'journals' are coming into being, only to be distinguished from normal web-sites by organised peer review.

A publication with scholarly ambitions can be recognised by the circumstance that the referees can be traced. For referees it is vital that all aspects of a study: texts, images, references (which is not the same as referees) can be retrieved.