
Appendix 12

Functional Classification

Commentary on an experimental subject configuration for the exploration of interdisciplinary relationships between organizations, problems, strategies, values and human development¹

A. INTRODUCTION

The *Yearbook of International Organizations* (Volume 1) in 2001 describes or lists over 30,700 bodies which can in some way be considered international organizations. Whether governmental or nongovernmental, their activities interweave in a myriad ways in the processes of the international community. Although organizations are listed in alphabetical order of titles and abbreviations in Volume 1 of the *Yearbook* and a multilingual index is provided, this nevertheless fails to provide an ordered, comprehensible overview of how such activities interrelate. In the absence of any such ordering, tendencies to fragmentation are reinforced and subtler approaches to integration are hindered.

This paper clarifies this challenge and describes the factors entering into the design of the process from which the activity classification in this volume emerged as a **first** product. It is important to note, as is explained below, that it is unnecessary to read or agree with the contents of this paper in order to derive **practical** benefit from the classification in its present form. The concern of this paper is to point out other ways of making use of the classification and the possibilities for its **further development**.

1. Review of classification of organizations in the *Yearbook of International Organizations*

When the predecessor of the *Yearbook of International Organizations* was first produced in 1910, the organizations were classified in it according to the Universal Decimal Classification (UDC) system. This was to be expected given that the person co-responsible for both the UDC and for the organizations publishing the *Annuaire de la Vie Internationale* (as it was first known) was Paul Otlet, often referred to as the "father of international documentation". In 1910, on the occasion of the 1st World Congress of International Associations, he produced a "Tableau de l'Organisation Internationale" grouping organizations (and conferences) by subject area. An improved version of this was produced in 1924 by him, on the occasion of the 4th Conference of International Associations, covering some 400 international bodies with comments on their activities.² The practice of using the UDC for classifying international organizations in its archives was in fact continued up until 1960 by the Union of International Associations.

The use of the UDC proved however to be too cumbersome for the organization of the *Yearbook of International Organizations* after its resuscitation in 1949. Between 1951 and 1965 (10th edition), organizations were grouped into some 20 subject chapters and allocated a simple filing number for indexing purposes. The number changed from edition to edition as a result of additions. Intergovernmental bodies were grouped in a separate non-subject chapter. This system proved progressively less satisfactory due to the emergence of organizations which could be usefully allocated to more than one subject chapter.

¹ A J N Judge. Presentation of GPIID integration through functional classification of international organizations. (Paper represented to 5th Network Meeting of the Goals, Processes and Indicators of Development project of the United Nations University, Montreal, 1980).

²² Paul Otlet. Tableau de l'Organisation Internationale; organismes internationaux et activités internationales (2ème partie du Rapport général à la Conférence des associations internationales, Genève, 1924). Bruxelles, Union des Associations Internationales, 1924, 37 pages, UAI Publication Nr 114.

In the 11th and 12th editions the organizations were ordered alphabetically in an encyclopedia format. A systematic permanent numbering system was maintained in parallel as a development of the earlier subject division. The approach created filing problems so that, in anticipation of the conversion to computer processing, organizations were given a permanent filing number from the 13th edition (1970-71). The subject-based numbering was abandoned from the 14th edition. The original subject "chapter" division was however maintained, with some additions, until 1980, in order to ensure statistical continuity. But from the 15th edition (1974) such statistics proved increasingly suspect due to the problem of overlap between categories and despite the introduction of "secondary" classifications. It was recognized that a totally different approach would have to be used.

2. Review of other approaches to international organization classification

The Union of International Associations is obviously not the only body faced with the problem of classifying international organization activities. In searching for better approaches it is therefore important to take into account other initiatives, even if their focus is not solely concerned with international organizations.

Of greatest potential value is the **Macrothesaurus; a basic list of economic and social development terms**.³ This was first published in 1972 by the Organisation for Economic Cooperation and Development (OECD) in collaboration with other bodies, including the FAO and the ILO. Unfortunately its value is limited by the range of subjects indicated by its sub-title. It is however adapted to computer processing and exists in a multi-lingual version. It uses a 6-digit subject code.

Also of great potential value is the initiative of the International Federation for Documentation (FID), under contract to UNESCO, to design a **Broad System of Ordering**.⁴ This is known as BSO and reflects FID's experience as the agency responsible for the UDC. The BSO was intended as the basis for interconnecting information systems within the framework of the Intergovernmental Programme for Co-operation in the Field of Scientific and Technological Information (UNISIST). The most recent draft was published in 1978. It has met with severe criticism and is not particularly well-designed for computer processing. In addition, as might be expected from the priorities of UNISIST, the range of subjects does not respond to the detail or variety encountered in the *Yearbook of International Organizations*.

Simpler in many respects, and therefore of greater practical value, is the inter-organizational exercise within the United Nations system carried out by the Inter-Organization Board for Information Systems (IOB) with the approval of the Administrative Committee on Coordination (ACC). This resulted in the production of a list of **Broad Terms for United Nations Programmes and Activities** in 1979.⁵ The 2,500 terms are grouped in 16 activity divisions defined at this stage by a 3-digit code permitting further development. The difficulty here is that the system does not appear to have been further developed and does not yet respond to the variety encountered in the *Yearbook*, especially as reflected in the concerns of nongovernmental organizations.

Also of great interest as a practical approach is the technique used by the publishers of commercial subject directories for multi-lingual users. An example is the "yellow page" directory produced for Belgian

³ Organisation for Economic Cooperation and Development. Macrothesaurus; a basic list of economic and social development terms. Paris, OECD, 1972.

⁴ Fédération internationale de documentation. Broad System Ordering; schedule and index. The Hague/Paris, FID/UNESCO, 1978, 3rd edition.

⁵ Inter-Organization Board for Information Systems. Broad Terms for United Nations Programmes and Activities. Geneva, United Nations, 1979.

Figure 1. Matrix organization of subject fields
(Reproduced from I Dahlberg, ICC – Information Coding Classification)

AREAS	1	2	3	4	5	6	7	8	9
1 FORM & STRUCTURE AREA	11 Logic	12 Mathematics	13 Statistics	14 Systemology	15 Organization	16 Metrology	17 Cybernetics (Controlled & Automatic)	18 Standardization	19 Testing & monitoring
2 ENERGY & MATTER AREA	21 Mechanics	22 Physics of matter	23 General & technical physics	24 Electronics	25 Physical chemistry	26 Pure chemistry	27 Chemical technology & engineering	28 Energy science & technology	29 Electrical engineering
3 COSMO & GEO-AREA	31 Astronomy & astro-physics	32 Astronautics & space research	33 Basic geo-sciences	34 Atmospheric sciences & technology	35 Hydrosphere & oceanology science & tech.	36 Geological sciences	37 Mining	38 Materials science & metallurgy	39 Geography
4 BIO-AREA	41 Basic biological sciences	42 Microbiology & cultivation	43 Plant biology & cultivation	44 Animal biology & breeding	45 Veterinary breeding	46 Agriculture & horticulture	47 Forestry & wood sciences & technology	48 Food science & technology	49 Ecology & environment
5 HUMAN AREA	51 Human biology	52 Health & theoretical medicine	53 Pathology & medicine	54 Clinical medicine & cure	55 Psychology	56 Education	57 Profession, labour, leisure	58 Sports	59 Household & home-life
6 SOCIO-AREA	61 Sociology	62 State & politics	63 Public administration	64 Money & finance	65 Social aid, social politics	66 Law	67 Area planning, urbanism	68 Military science & technology	69 History
7 ECONOMICS & TECHNO- LOGY AREA	71 General & national economics	72 Business economics	73 Technology in general	74 Mechanical & precision engineering	75 Building	76 Commodity science & technology	77 Vehicle science & technology	78 Transport technology & services	79 Utilities & service economics
8 SCIENCE & INFORM- ATION AREA	81 Science of science	82 Information sciences	83 Informatics, computer sciences	84 Information in general	85 Communication science	86 Mass- communication	87 Printing & publishing	88 Communication engineering	89 Semiotics
9 CULTURE AREA	91 Language & linguistics	92 Literature & philology	93 Music & musicology	94 Fine arts	95 Performing arts	96 Culture sciences	97 Philosophy	98 Religion & secret teachings	99 Christian religion

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telephone subscribers. Subjects are given a 4-digit numeric code which does not however have any classificatory significance except to provide a numeric sequence. Separate indexes in English, Flemish, French and German enable users to locate each subject.

It is significant that none of the above initiatives is especially concerned with the pattern of relationships between activities or subjects. The allocation of numbers to activities is basically arbitrary. The project of Ingetraut Dahlberg, Editor of the journal *International Classification*, resulting in the production in 1981 of an **Information Coding Classification** (ICC) system,⁶ therefore merits special attention in a following section. One of its advantages is the use of a 4-digit code. But one difficulty in relation to this project is that the schedule of terms has so far only been published for 3-digits, raising problems in handling other topics with which international bodies are concerned.

3. Possibilities of an alternative approach

Serious attempts were made to use several of the above schemes for the *Yearbook* in the period 1979-81, either singly or in

⁶ Ingetraut Dahlberg. ICC - Information coding classification; principles, structure and application possibilities. *International Classification*, 9, 1982, 2, pp 87-93. (Reprinted with 3-digit schedule in: INDEKS GmbH. Classification Systems and Thesauri, 1950-1982. Frankfurt, INDEKS Verlag, 1982).

combination. For a variety of reasons they proved impractical. The decision was therefore made to design a new scheme adapted to the specific problem of handling international organizations and their activities.

Once this decision was taken it created the opportunity of responding to many of the less apparent constraints encountered when attempting to use the above general schemes. These have been discussed in a separate paper on anti-developmental biases in thesaurus design,⁷ on the occasion of a conference initiated by the Committee on Conceptual and Terminological Analysis (COCTA).

4. Preliminary design considerations

The point of departure was the system, mentioned above, developed by Ingetraut Dahlberg, following proposals first made by her in 1971. The general outline of her ICC scheme may be seen from Figure 1.

⁷ A J N Judge. Anti-developmental biases in thesaurus design. Fred W Riggs (Ed). The CONTA Conference; Proceedings of the Conference on Conceptual and Terminological Analysis in the Social Sciences (Bielefeld, 1981). Frankfurt, Indeks Verlag, 1982, pp 185-201.

The following features of the scheme are of special interest:

- a) It is based on a concern for "man's ability to perceive the world, and to construct a system of knowledge units to facilitate his understanding of the world and communication about its nature."⁸
- b) It recognizes that the "structuring of man's knowledge about the world may be seen as being related to the optical levels of general, world-immanent objects by an evolutionary sequence which, however, is of a spiralling rather than of a linear nature."⁹
- c) It is ordered **vertically** in terms of 9 optical levels associated with a progressive complexification of perceived reality:
 - i. Pure forms and structures (magnitudes, proportions)
 - ii. Pure matter and energy (atoms, forces, etc)
 - iii. Aggregated matter in motion (cosmic bodies)
 - iv. Animated, non-intelligent beings (micro-organisms, plants, animals)
 - v. Animated, intelligent beings (individual human beings)
 - vi. Aggregated, intelligent beings (human societies)
 - vii. Material products (goods and services)
 - viii. Intellectual products (documents, information)
 - ix. Spiritual products (language, works of art and other meta physical works.¹⁰ These are distinguished by the **first digit** of the ICC code.
- d) It is ordered **horizontally** from the non-fundamental disciplines at each level (on the left) to those concerned with application of that knowledge (on the right). These are distinguished by the second digit of the ICC code.
- e) **Within** any area of the resulting matrix, a structured sequence for the system positions was applied for the repeatable arrangement of the elements of each group. These are distinguished as follows:
 - i. General and theoretical statements (axioms, etc)
 - ii. Object-related statements (elements of objects, parts, kinds of object, etc)
 - iii. Activity-related statements (states and processes in objects, operations applied to them, etc)
 - iv. }
 - v. } Statements related to specialities of the objects and/or
 - vi. } activities concerned in 2 and 3
 - vii. } Statements on influences onto 2 and 3 from outside
 - viii. } ("instrumental", technical relationship)
 - ix. } Statements on the use of 2 and 3 in other fields ("potential", resource orientation, application relationship)
 - x. } Statements of the knowledge about 2 and 3 in distributing it by human beings, societies, documents, etc ("actualization", synthesizing, environmental relationship). These are distinguished by the **third** digit of the ICC code.

Dahlberg has elaborated, published and applied the scheme¹¹ using three digits (some 700 classes) and hopes to publish a more extended **four-digit** version (some 7000 classes).¹²

If the four-digit version had been available when the editors were considering a new classification system for the *Yearbook*, it is probable that it would have been used to design the coding system for international organizations. In experimenting with the various possibilities however it became apparent that there was a basic awkwardness and bias in making all the preoccupations of such bodies subservient to "knowledge" of "objects". This problem is particularly striking when a social reality like "homelessness" is classified under an intellectual discipline, namely "sociology", as in the case of the *UNESCO Thesaurus*.¹³ Similarly a value and condition of fundamental importance like "peace" is classified

under an intellectual discipline such as "political science", or, again, "friendship", "love" and "hatred" are classified under "psychology". Positioning values, conditions and forms of praxis in this way can be seen as reinforcing the dominance of the knowledge function during a period when the international community recognizes a need to enhance action, the "will to change", as well as the emergence of new values. Many organizations perceive themselves as concerned with praxis and do not relate directly to the intellectual disciplines by which their actions are supposedly governed according to university faculties.

In the light of the ICC scheme the question then became one of de-emphasizing this bias in favour of knowledge, whilst at the same time respecting the concerns reflected in the ordering of the matrix. One criterion of an interesting matrix, for example, would be the possibility of mapping onto it at different locations the various agencies and institutions required for the "operation" of a country or the world (eg various government ministries, hospitals, factories, farms, airports, military bases, etc). In this way the matrix would become a tool reflecting **operational reality** to a greater degree, rather than responding primarily to the difficulties of designing information retrieval systems to facilitate research and the generation of further knowledge.

Another valuable feature of such a matrix would result from ensuring that it told a **developmental "story"**. This feature is to some extent present in the ICC matrix in that the "lower" optical levels reflect the earlier phases in an evolutionary process, whilst the "higher" levels reflect the relatively recent phases of civilization. But it is possible that a more interesting developmental story (or stories) could be embedded in the structure of the matrix. This would be especially valuable if it highlighted the stages at which different functions emerged in society (eg social organization, mutual care, shelter, artifact construction, etc). As argued in an earlier paper,¹⁴ this implies a dynamic **emphasis on processes** in contrast to the conventional static emphasis in classification schemes on states and objects. A number of authors are now arguing against the insidious effects of static (Euclidean, Newtonian, Cartesian) descriptions of reality as favoured by the "Western" mode of thought.^{15 16 17} It can certainly be argued that this emphasis undermines a dynamic approach to development.¹⁸

Clearly the above features would emphasize the "interweaving" of the cells of the matrix. This approach is to be contrasted with the practice adopted in the design of many thesauri. So little attention is devoted to the relationship between major classes that it is easy to get the impression that any such relationship is totally arbitrary - isolated subject clusters ("science", "religion", "art", "commerce", etc) denoted by digits from 1 to 9, etc. The "lumping" of **major** classes together in this way does not appear to have changed significantly throughout the history of classification schemes from 1200 BC to the recent initiatives of the intergovernmental community.¹⁹ It is not difficult to argue that it is this arbitrariness which deprives the pattern of classes of any significance as a whole. As such it reinforces the fragmentation of society which many authors have deplored, as well as undermining any efforts towards an "integrated", "interdisciplinary" or "holistic" pattern of action.²⁰

5. Insights from periodic classification

As a guide to further insights for the design of a more interesting solution, what appeared to be required was some matrix-type model incorporating developmental features reflecting the emergence of a

⁸ Ingetraut Dahlberg. *Ontical Structures and Universal Classification*. Bangalore, Sarada Ranganathan Endowment for Library Science, 1978, p6.

⁹ *idem*, p7.

¹⁰ *idem*, p35.

¹¹ Dahlberg. ICC - Information coding classification; principles, structure and application possibilities.

¹² Stored in machine readable form (for up to 6 digits), but at the time of writing (November 1983) not available in printed form.

¹³ Jean Aitchison (Comp.) *Unesco Thesaurus*; a structured list of descriptors for indexing and retrieving literature in the fields of education, science, social science, culture and communication. Paris, UNESCO, 1977, 2 vols.

¹⁴ Judge. *Anti-developmental biases in thesaurus design*.

¹⁵ David Bohm. *Wholeness and the implicate Order*. London, Routledge and Kegan Paul, 1980.

¹⁶ Fritjof Capra. *Turning Point*. New York, Simon and Schuster, 1982.

¹⁷ Magoroh Maruyama. *Mindscapes, social patterns and future development of scientific theory types*. *Cybernetica*, 23, 1980, 1, pp 5-25 (see also earlier papers in the same journal).

¹⁸ Judge. *Anti-developmental biases in thesaurus design*.

¹⁹ E I Samurin. *Geschichte der bibliothekarisch-bibliographischen Klassifikation*. München, Verlag Dokumentation (now Saur Verlag), 1977.

²⁰ Bohm, *op cit*.

series of qualities organized into corresponding "groups" at a succession of "levels". The richest conceptual scheme of this kind appears to be the periodic table of (chemical) elements. The possibility of generalizing this periodic system seems first to have been explored by Edward Haskell.²¹ Inherent in such a scheme are many interdependency relationships. Furthermore, in comparing J W van Spronsen's history of the development of the periodic classification system²² with that of Samurin's history of the development of the classification of knowledge in general,²³ it is possible to conclude that a scheme such as that of Dahlberg corresponds in structure to the penultimate development phase prior to the emergence of the fully fledged periodic system. Many conventional classification schemes correspond however to much earlier phases in this development with only rudimentary relationships between major classes. In considering the possibility of such a fully-fledged periodic system, it is useful to bear in mind the following remark by A J Ihde in the foreword to van Spronsen's survey:

"Facts soon reach a point where they become less and less manageable unless an attractive and meaningful system of classification is brought into being... Equally important is the role of tools in science..."

*It is frequently not recognized that tools may be conceptual as well as physical... The Periodic System has fulfilled both of these roles. It has served as a classificatory device but it has contributed much more than mere classification. It has been a conceptual tool which has predicted new elements, predicted unrecognized relationships, served as a corrective device, and fulfilled a unique role as a memory and organization device. The periodic table has contained an innate flexibility which has prevented it from becoming frozen into a rigid structure. It lends itself to a large variety of forms. Although many of these are unique only as schemes representative of the author's originality, certain forms have unique value in bringing out particular relationships."*²⁴

On this last point it is striking to compare the range of experiments with spirals, tables, circles, cones, cylinders and other figures (see Figure 2) in portraying the classification of elements²⁵ against the seemingly universal preoccupation with simply structured lists in the case of the classification of knowledge.²⁶ In this sense the Dahlberg scheme is indeed an exception. To clarify the discussion it is useful to note how one frequent form of the periodic table (Figure 3) can also be presented in another way (Figure 4) which resembles more closely Dahlberg's ICC scheme. The "groups" of chemical elements then tend to appear in columns, analogous to those denoted by the ICC second digit. The transformation from Figure 3 to Figure 4 clarifies the distinction between two "sub-groups". This is even clearer in a circular form of the table (Figure 5).

B. DESIGN CONSIDERATIONS

The design envisaged was perceived as a compromise between three major "orientations": production of a practical classified directory; facilitation of experiments on classifications to develop improved versions; and an emphasis on incorporating richer patterns of relationships between activities to facilitate understanding of functional integration. These are detailed separately below.

1. Practical orientation

In the light of the above survey, the factors affecting the design of a practical system may be summarized as follows:

- it should respond to the progressive increase in number of organizations with multi-subject concerns;
- it should meet the need for a relatively simple classification scheme;
- it should facilitate incorporation of changes in organizational activities with the emergence of new issues (environment, energy, etc);
- it should avoid the production delays associated with conventional methods of classification, particularly with increasing numbers of organizations and with the change in their concerns;
- in order to facilitate solutions to the above problems, it should use an approach which could be assisted by computer techniques as much as possible;
- finally, and perhaps of greatest importance, it should result in the production of a practical directory which avoids confronting the average user with levels of significance or complication not required, even though these features may be present for those who wish to benefit from them.

2. Experimental orientation

In contrast to most current classification systems, the design should facilitate classification experiments in the light of the following factors:

- it was not intended to produce immediately a "definitive" classification scheme for international organization activities;
- it was expected that different approaches will be explored from edition to edition, possibly with several approaches in one edition;
- the position of classes or sub-classes in any one matrix pattern might be adjusted between editions in the light of the results to which it gave rise when tested on the range of international organization activities;
- it was expected that refinements to the computer programmes used would lead to more valuable versions of the scheme;
- the flexibility necessary for such an experimental approach should be achieved by computer-assisted methods of reclassifying the complete range of organizations whenever a new version of the scheme is required;
- as an experimental system, risks would necessarily be taken which might give rise to errors, but every effort would be made to minimize their significance for users interested only in the practical value of a given classification scheme.

3. Pattern building orientation

It is hoped that experiments in classifying international organization activities will be carried out to highlight significant patterns of relationships between them in the light of the following factors:

- an emphasis less on possible bilateral relationships between any two subject areas (eg medicine and sport) as on portraying the complete range of classes in some functionally meaningful pattern of relevance to organization activities;
- the intention to explore ways of ordering the classes within as many simultaneously interweaving patterns as proves feasible;
- in developing such patterns a major constraint is that of maintaining and improving the comprehensibility of any such scheme.

Further detailed description of how this approach gave rise to the subject matrix in Figure 4.1.1, is given at <http://www.uia.org/uiadocs/classif3.htm>

²¹ Edward F Haskell. Generalization of the structure of Mendeleev's periodic table. In: E Haskell (Ed.), Full Circle; the moral force of unified science. New York, Gordon and Breach, 1972, pp 21-87.

²² J W van Spronsen. The Periodic System of Chemical Elements; a history of the first hundred years. Amsterdam, Elsevier, 1969.

²³ Union of International Associations/Mankind 2000. Yearbook of World Problems and Human Potential. Brussels, UAI/Mankind 2000, 1976. See also: Union of International Associations. Encyclopedia of World Problems and Human Potential. München, K G Saur Verlag, 1986, 2nd edition.

²⁴ Dahlberg. ICC - Information coding classification; principles, structure and application possibilities. p ix.

²⁵ van Spronsen, op cit.

²⁶ Samurin, op cit.