Medicine and the UDC
The Process of Restructuring

Abstract
This project to reconstruct and update the UDC Medicine Class (61) is an experiment in the ongoing development and revision of the Universal Decimal Classification as a whole. As part of that process, in 1988 the UDC Management Board recommended the establishment of a limited life Taskforce on UDC System Development to advise on the future development of UDC. That Taskforce recommended that a study be carried out to determine the feasibility of converting the system into a fully faceted classification. It was decided that the best way to accomplish this would be to convert one class. Medicine (Class 61) was chosen for the experiment for two reasons. First, this class was a part of the system that most out of date and greatly in need of revision, and secondly, it presented an opportunity to test an approach to the subject matter which would be in line with modern methods of the study and practice of medicine. This project is a direct response to that recommendation. Phase 1 of the project is now complete and Phase 2 is underway. This paper describes Phase 1 and its findings, identifies problems still to be addressed and sets out the methodology for Phase 2.

Introduction
Over its long history, the UDC has undergone many changes in its management and development. Its foundations are in Dewey Decimal Classification edition 5, but it has been developed independently from Dewey and with different objectives. It is a bibliographic classification primarily designed to organize bibliographic listings as opposed to organizing books on shelves. UDC inherits partial enumeration from Dewey but with its auxiliary tables and symbols “it is a synthetic classification, which means that the enumerated classes are the building blocks whereby compound and complex classes may be denoted by various synthetic notational devices” (McIlwaine 2007, 9). UDC was an inspiration for the development of Ranganathan’s Colon Classification (Ranganathan 1933). “A truly faceted classification does not permit the listing in schedules of any combination of terms and states each concept in simple terms. While it is not fully faceted, in that sense, the principles of facet analysis are inherent in the structure of UDC” (McIlwaine 2007, 33). For it to become so, it would need to completely shed its historical connections with Dewey (Dewey 1894). One UDC class where this has already been achieved is the recently approved Class 2 Religion, Theology. This project is a further attempt to move in that direction.

Support for this project is also found in the work of the Classification Research Group (CRG) in the UK. Following from Ranganathan, the CRG refined his principles and applied them in a number of special subject schemes and in the development of the Bliss Bibliographic Classification (BC2). That system is fully faceted and applies sound principles of facet analysis. While BC2 is still in progress, the schedule for Class H: Anthropology, Human Biology, Health Sciences has been published and is being used in this project.

Phase 1
Phase 1 began with the establishment of the following goals: to address the question of the feasibility of converting UDC to a fully faceted system; to provide an up-to-date UDC class for medical sciences; to create a table that can be used in conjunction with the existing UDC; to achieve a display of topics commensurate with the modern approach to
the study and practice of medicine; and to provide a table with depth of analysis commensurate with the recently published Standard Edition of UDC (2005–2006).

In support of these goals, the human biology and health sciences section of BC2 Class H (Mills, and Broughton 1981) was chosen as the basis for the framework of the proposed UDC Class 61 table. Its suitability for the task was judged to be its sound principles of facet analysis and its emphasis on the grouping of the subtopics of medicine by systems of the body. This approach is currently used in the study and practice of modern medicine. Because of the age of Class H (1981), it was recognized that additional support would be needed from such as tools as Medical Subject Headings (MeSH) and the ICD-10: International Statistical Classification of Diseases and Related Health Problems.

To establish the framework, the first step was to work with Class H schedule and to convert it to a UDC-like system. The Class H schedule was scanned and converted to machine readable form. The notation was stripped out and the data were divided into sub-classes (e.g. curative medicine, clinical medicine, diseases and pathology, cardiovascular system, etc). Figure 1 below illustrates the BC2 format. The facets are shown in parentheses.

In Figure 2 below, the BC2 notation has been stripped out and replaced with UDC numbers. The topics have been arranged and subarranged. Built topics appear as example(s) of combination under a main caption. The facets are worked into the examples as parts of the built numbers and the remainder is built up from other subclasses in the 61 class, and where appropriate, from other parts of the UDC classification.

Figure 2 illustrates facets in four ways — in the captions by such phrases as “617.231 – by manifestation” and “617.232 – by cause”; as class numbers following the colon and taken from 615 Diseases and Pathology e.g. 617.231:615.2 – Neoplasms (malignant); in the numbers (e.g. -044.88) taken from the common auxiliary tables, and from the special auxiliary table of types of diseases in 615 (e.g. -216.12 oedema; -216.22 rupture and -216.42 obstruction). In the built numbers, the last number represents the facet. The number 579.862 represents the name of the virus taken from the 570s in UDC and 618 … indicates an undeveloped section. In all, 14 subclasses were developed in this manner. All have been published as proposals in the annual publications Extensions and Corrections to the UDC, between 1993 and 2007.

Findings from phase 1
The resulting table is not a final scheme ready for use. Rather, it is basically Class H interpreted in the light of UDC and designed to act as a framework for the final product. The result is a flexible and workable system, which will accept new built numbers as needed and should not require frequent major revisions. The use of facets works particularly well in the tables on the various body systems where many of the diseases and other medical problems are contained under the label example(s) of combination. When new topics emerge, additional examples can be created easily. The tables are rich in terminology and this has had some affect on UDC as a whole. In particular, Phase 1 was instrumental in identifying some of the deficiencies in the tables of common auxiliaries and the work on Class 61 has provided considerable input to the development of tables 1k -02 Common auxiliaries of properties and -04 Common auxiliaries of relations, processes and operations which were created during the project. Not unexpectedly, the notation needs further attention and it was known from the outset that there would be major updating of data at phase 2. Also, clarification of the relationships between the proposed 61 tables and the rest of UDC is
Figure 1. BC2 Format

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUH</td>
<td>Heart, cardiology</td>
</tr>
<tr>
<td></td>
<td>(Disorders by manifestation)</td>
</tr>
<tr>
<td></td>
<td>(Dysfunction)</td>
</tr>
<tr>
<td></td>
<td>*For arrhythmia see disorders of physiological processes HUH OJ</td>
</tr>
<tr>
<td></td>
<td>(Enlargement)</td>
</tr>
<tr>
<td>HUH JK</td>
<td>Heart enlargement</td>
</tr>
<tr>
<td>HUH JL</td>
<td>Cardiac oedema</td>
</tr>
<tr>
<td>HUH JO</td>
<td>Heart rupture</td>
</tr>
<tr>
<td>HUH KA</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td></td>
<td>(Paroxysma dysporoea) see Respiratory disorders HWE OXX</td>
</tr>
<tr>
<td></td>
<td>(Neoplasms)</td>
</tr>
<tr>
<td>HUH ME</td>
<td>Carcinoid heart disease</td>
</tr>
</tbody>
</table>

needed. However, the project to this point has been relatively successful. Now there is a workable base from which to complete the work on the proposed Class 61, but there is still much to be done.

Phase 2
The objective of Phase 2 is to bring the proposed Class 61 to a workable conclusion. Initially, two questions need to be addressed: What exactly should be the content of the final version of the new medical class? What implications does content have for the rest of UDC? The answers to these questions are fundamental to the completion of the final version. The circumstances under which UDC 61 and BC2 Class H were created differ. UDC class 61 is a part of the whole of UDC, whereas in BC2 each class has been developed to stand alone. Thus Class H contains topics that make it “whole”, whereas in UDC some of these topics are dealt with in other classes, so there is an inevitable “knock-on” effect. For example, BC2 Class H has a substantial section on biochemistry. Should this be retained under medicine? Or should it, more logically, be covered in 57 with the rest of biochemistry? Biochemistry in UDC is another class that is sadly out of date, which means a major revision. In Class 61, there are some topics that have been split. For instance, the embryology of plants is in 581.3, of animals in 591.3, while human embryology is 611.013. On this, UDC and BC2 agree. Both put human embryology with medicine. Should the split be continued in the proposed 61, or should all embryology be together in 57 and the class number pulled forward into built numbers, as needed. In a faceted classification, it would seem that there might be some logic in the latter position. Numerous other cases of such problems exist and will need to be addressed in Phase 2. A brief survey will be conducted to determine how best to handle them. There will be a need for matching process between the proposed Class 61 and the whole of UDC to answer such questions as: What topics in the existing UDC 61 are missing from the new version? What topics related to medicine in the proposed new 61 are located elsewhere in UDC? What topics in other classes in UDC
Figure 2. UDC Format

617.231 Heart disorders by manifestation
   \[\rightarrow 617.243:616.72 \text{Congenital disorders of the myocardium}\]

Example(s) of combination:
617.231:615.2-021.473 Neoplasms (malignant). Carcinoid heart disease
617.231-044.88 Enlargement of the heart
617.231-214.11 Heart dysfunction
   \[\rightarrow 617.233:617.211 \text{Arrythmia}\]
617.231-216.12 Cardiac oedema
617.231-216.22 Heart rupture
617.231-216.42 Obstruction. Including: Congestive heart failure
For Paroxysmal dysporoea see
618... Respiratory disorders

617.232 Heart disorders by cause

Example(s) of combination:
617.232:615.3 Heart infections
617.232:615.4:579.862 Streptococcus haemolytica. Rheumatic heart disease

need to be revised or added to? This will require considerable cross checking between Class H, the two versions of class 61 and the whole of UDC. Most of the problems of this kind will occur in the subclasses on anatomy and physiology, health science (general), preventive medicine, curative medicine and clinical medicine. This will require the removal of some topics from medicine and major revisions in other areas of UDC.

There are several kinds of updating needed — internal updating of the new tables; updating with respect to the Standard Edition; updating of the diseases; and making sure that all topics in the present Class 61 are present or accommodated for in the proposed tables. Internal updating of the proposed tables is required because the various subclasses were created in serial order. Once a subclass was published we did not return to revise it, as ongoing revisions were made in UDC. Some class and table numbers chosen early in the project were superseded by ongoing revisions to the existing tables and the development of new common auxiliary tables. Hence there is an unevenness of application and numerous blanks exist where appropriate class numbers were not available; for example the two important common auxiliary tables, -02 and -04, that were not available at the beginning of the project. There are numerous blanks and incomplete cross references to other parts of the proposed 61 which were developed later in the project. While the proposals were being developed, the rest of UDC was in continuous revision. Moreover, the topics contained in the proposal are based largely on BC2. Albeit, BC2 has more detail than the current 61, but are all the topics in the current 61 covered? What are the differences in terminology? In summary, the proposed medicine class needs to be brought into line with the latest Standard Edition.

The updating problem is even more complex, in that the present Class 61 is very outdated — a reason for selecting it for this project. But BC2 Class H was published in 1981. Much has happened in medicine and the identification and treatment of diseases in the intervening 27 years. One of the most important tasks in Phase 2 will be the updating of proposed subclass 615 Diseases and Pathology. Subclass 615 lists the major diseases and is
fundamental to the development of the subclasses on the various body systems (616/619). General diseases listed here are taken as they apply to diseases and illnesses identified as attacking different parts of the body. Cancer (neoplasms), for example, has a basic class number 615.2 and this number is used under each body system together with the name of the type of cancer appropriate to that part of the body. Neoplasms of the heart are in “617.231:615.2-021.473. Neoplasms (malignant) Carcinoid heart disease.” Lung Cancer appears as “618.531:615.2 Lung neoplasms. Including: Bronchiolar carcinoma. Bronchogenic carcinoma. Pancoast syndrome”. Other tools are needed to aid in this segment of the revision. The World Health Organization’s *International Statistical Classification of Diseases and Related Health Problems*, supplemented by the National Library of Medicine’s *Medical Subject Headings* will be used. The WHO publication will be most helpful as it is subarranged by systems of the body and is in classified order. Also particularly useful will be the sections of the print edition of MeSH which list subject headings added annually to the system from 1981 to 2003. Both are up-to-date and available online.

Another aspect of the revision is the use of special auxiliary tables. In the present 61 there are numerous special auxiliary tables. There are only two special auxiliary tables in the proposal for diseases in 615 and for regions and parts of the body in 616. Should there be more? Are there other subtopics which should be dealt with in this way (e.g. medical equipment?) Or should all equipment be listed in 68 under manufactures and coloned as appropriate?

Finally, there are concerns about the notation which must be addressed. At the very least, the notation needs to be adjusted. At the outset, it was impossible to determine precisely how much space would be needed to handle each of the subclasses. They are unequal in content and, not unexpectedly, there is some crowding at the end of the class. While it can be anticipated that some sections may be moved elsewhere freeing some space, it may not be sufficient and there is a need to allow for the future. As far as the class as a whole is concerned, much additional growth may be due to the addition of new diseases. Some of this will be absorbed in the examples and may not require new class numbers but this cannot be counted on as a certainty. One suggestion is that medicine be moved to 4 which is currently vacant, thus providing a 100 number base instead of a base of 10. Long class numbers are a problem in some cases and some people feel that a full 100 number base would contribute to shorter class numbers. This may be partly so, but the depth of analysis also has a bearing on the length of class numbers. While the intention is to equate Class 61 with the UDC Standard Edition, in its final form, Class 61 will still be very detailed.

**Conclusion**

Phase 1 appears to have resulted in a usable framework based on sound principles which should make the next steps easier to accomplish. While there is still much detailed work to be done, the move toward the final result should be accomplished much more quickly than Phase 1, because there is now a basis for it. Once the work is completed, it still has to be submitted to a panel of experts for review and analysis.

**References**
