

Maintenance of the Universal Decimal Classification: overview of the past and preparations for the future

Aida Slavic

UDC, Associate editor
aida.slavic@udcc.org

Maria Inês Cordeiro

UDC, Editor in Chief
ines.cordeiro@udcc.org

Gerhard Riesthuis

UDC, Associate editor
gerhard.riesthuis@udcc.org

UDC Consortium, The Hague

Abstract: The paper highlights some aspects of the UDC management policy for 2007 and onwards. Following an overview of the long history of modernization of the classification, which started in the 1960s and has influenced the scheme's revision and development since 1990, major changes and policies from the recent history of the UDC revision are summarized. The perspective of the new editorial team, established in 2007, is presented. The new policy focuses on the improved organization and efficiency of editorial work and the improvement of UDC products.

1. Introduction

Users of the UDC, or any other classification for that matter, are often confronted with the end-results of a scheme evolution without being aware of the reasons or policy that may have led to particular developments. The changes that have been made to UDC recently, for instance, had been discussed years or even decades ago and were recorded in research papers, articles and books. But, as time passes, most of these arguments and decisions are forgotten and have to be rediscovered. Then, in addition to task commitments that started long ago, there are always new circumstances that influence the use of classification and that have to be recognized and taken into account.

In 2006-2007, a new UDC editorial team was established and this paper explains how it sees its connection with the past and the priorities it recognizes for the next period. First, we revisit some of the circumstances that led to significant changes in UDC maintenance, distribution and revision during the period 1993 to 2006. Taking into account the large volume of work on UDC that has taken place in recent years, we will provide an overview of changes that users may expect in the future.

2. The evolution of UDC from an editorial perspective

2.1. Period 1960-1990: looking for the best way to improve UDC

It is worth remembering that in the 1960s information professionals were very disenchanted with library classifications in general. This was so for the majority of the most widely used systems such as Dewey Decimal Classification (DDC), Library of Congress Classification (LCC), Bliss Bibliographic Classification (BC) or UDC. The structure of these systems was essentially static, mainly based on a 19th century view of knowledge and science. At the time, there was great concern about organizing and indexing scientific documentation for which these systems seemed to be ill-suited. Discussions flourished on how and even whether these systems - already used worldwide - could be improved and made fit for this purpose.

In 1967, UNISIST and the *International Council of Scientific Unions* commissioned a comparative study of indexing languages for the development of the information network by

the *Aslib Research Department* team, chaired by B. C. Vickery. Although UDC was the 'least unsatisfactory' of existing classification schemes and judged 'less faulty' than other systems, Vickery suggested the creation of a new classification for the purpose of information exchange (Foskett, 1973). This triggered action from the *International Federation for Information and Documentation* (FID) and in the following decade efforts were made towards system analysis and discovering solutions for both UDC restructuring and changes in UDC management and maintenance.

Lloyd (1971), head of the classification department in FID at that time, claimed that UDC was in need of 'drastic treatment and more efficient organization' that would speed up the 'hyper-democratic' revision procedure in place. Wellisch (1971) also argued that the existing procedure was hindering the real progress of revision and that complete restructuring of the organization was needed. His proposal was that decision-making should be transferred from FID/CCC (Central Classification Committee) to an editorial board consisting of four or five members working under a chief editor. His suggestion that a 'medium' edition would satisfy the needs of most users was, for instance, also supported by Lloyd (1972).

Many of the objections to the classification from that period were a consequence of its extensive and decentralized expansion, which led to the overlapping of concepts that had been added to the existing 19th century semi-enumerative structure. By the beginning of the 1980s the full edition of the classification had exceeded 200,000 classes, as a result of the work of many national and international subject panels. The work was not well coordinated and the plethora of concepts, and the incoherent manner in which they were added to the system, contributed to the difficulties in its management and mechanization.

By the end of the 1980s an abundance of proposals to cope with such difficulties had already been made. Atherton and Freeman suggested better recording of explicit syntax rules and strict formalisation of notation (Freeman & Atherton, 1969). Lloyd (1972) proposed vocabulary and syntax improvement, while Wellisch (1971) suggested that more precise revision rules would be needed through systematic and consistent principles for the recognition and application of the characteristics of division within main classes. For him, the existing guidelines "UDC revision and publication procedure", published in 1968, were unsatisfactory.

Rigby (1971) suggested adding better cross-referencing facilities and subject-alphabetical indexes. Dahlberg (1971) emphasized that UDC numbers needed to be such that they could be "fed into a computer in wholly unchanged form". She also suggested the following measures: the abolition of the meaningless decimal point as this would reduce the size of numbers and the use of letters as facet indicators for main auxiliaries, following Atherton and Freeman. Kyle's (1961) and Vickery's (1961) suggestion for system faceting and better exploitation of UDC's synthetic features and facet analysis was later revisited by Dahlberg (1971) and Neelameghan (1976). Following the conclusions of the Dorking Conference, in 1957,¹ Dahlberg asserted that "the use of faceted structure as a basis for post-coordinating classification [was already] generally recognized as desirable for a classification system" and proposed its application to UDC (Dahlberg, 1971: 24). But what she actually proposed was the creation of a complete new system that would have a different outline of the main classes, uniform structure, simpler symbols, greater flexibility in synthesis and diversified editions to meet different users needs. Dahlberg, for instance, suggested that if UDC were to be fully faceted, schedules should be structured into three parts for adequate system automation: (a)

¹ Dahlberg cites the recommendation from Dorking "the most helpful form of classification scheme for information retrieval is one which groups terms into well-defined categories, which can be used independently to form compounds, and within which the terms can be arranged in hierarchies where this conforms to the recognized structure of relations between them" (Proceedings of the International Study Conference on Classification for Information Retrieval. Dorking, 13-17 May 1957. London: Aslib, 1957, p.175.)

UDC tables - containing simple concepts; (b) UDC codes - containing compound numbers; (c) UDC Index - possibly in the form of a thesaurus.

To sum up, many classification experts agreed, in the 1960s and 1970s, upon several main points. From the management perspective, it became clear that automation was essential for the maintenance of the scheme and that it would be more practical to keep the scheme's size at the level of the medium edition. In terms of content, many argued that the scheme ought to be structurally improved and that facet analysis and the weeding out of the enumeration of compound terms represented by simple notation would be the appropriate way forward.

The commitment to develop UDC as a faceted scheme was made official by an FID/CCC Extraordinary meeting in 1976. Document C75-35 was released which stated that UDC is to be transformed into a fully faceted scheme based on a methodology put forward by A. F. Schmidt and J.-H. de Wijn (Ścibor & Shcherbina-Samojlova, 1990). Due to the size, ambition and cost of the project, this plan never became operational but it has influenced future incremental and gradual transformation of the schedules towards becoming a faceted classification.

At the beginning of 1983, FID commissioned an external study to find a better way of managing UDC. The study results were published in 1984 and reported the following positive outcomes: the proposal of a new UDC management structure that later helped in handling the problem of computerising the UDC maintenance process, undertaking a strategic review of revision needs, and taking the necessary steps to change faults in the classification structure (Gilchrist, 1992, McIlwaine, 1998).

The UDC Management Board was created in 1986 to carry out the changes and, in 1989, it decided to set up a *Task Force for UDC System Development*, with international membership,² which in a short period of time produced a strategy paper that offered a more concrete plan for long-term development of the UDC. Recommendations that have been scattered in various research papers and studies since the 1960s were revised, summarised and brought up-to-date in the final report of the Task Force team, in February 1990 (FID Internal Documentation, 1990). This report was the basis for the management, maintenance and revision that were recorded in the *Guidelines for the creation of a standard version of UDC* (FID Internal Documentation, 1991).

2.2 The rapid pace of change from 1990 to 2006

The year 1990 marked a new beginning for the management of UDC. In 1991, the guidelines for the creation of the standard UDC were produced upon recommendation of the Task Force. On the 1st January 1992 FID transferred the UDC rights to the newly formed Universal Decimal Classification Consortium (UDCC), a consortium of publishers established as a non-profit institution, legally based in The Netherlands and registered as a Dutch foundation (Strachan & Oomes, 1995). Following the change in ownership, the UDC revision process and decision-making was centralized and transferred to a revision committee consisting of two to three members and an editor-in-chief. This would enable faster revision processes and reduced UDC maintenance costs, meeting the UDCC's first priority: to modernize the scheme, reduce its maintenance and distribution costs through automation and to make its management sustainable.

The first task towards automation was completed in 1993 and consisted of the downsizing of what was, during FID's time, a full UDC edition into a more manageable system of 60,000

² The members of the UDC Task force were: A.-R. Haarala, Finland; H. Jobst, Austria; I. C. McIlwaine (chairman), United Kingdom; Gerhard Riesthuis, The Netherlands; Nancy Williamson, Canada. The observers were A. Gilchrist (United Kingdom), David Strachan, FID (Task force for UDC system development: final report, February 1990).

classes, since then designated the UDC Master Reference File. In the same year, Gerhard Riesthuis and David Strachan created, in CDS/ISIS, a database for the Master Reference File, from a text file of the *British Standards Institution* (BSI) medium edition (BS 1000M) of 1985 with the addition of subsequent extensions and corrections.

The second and more demanding task was the revision of the entire UDC content, to be carried out by an editor in chief with a small team of researchers. According to the Task Force report, "the total restructuring of the classification in an organized manner over a ten year period [was] envisaged". The report outlined a possible way forward and some recommendations for revision were fairly specific, e.g.:

"It was felt that at present a general problem was the confusion between enumeration of compound and faceting and that the latter approach should be advocated. It was agreed that every effort should be made to maintain an expressive notation as far as possible. [...] a thorough overhaul revision of both general and special auxiliaries was needed, since in the latter especially, some concepts were repeated which already occurred in the main classification schedules and in these cases a colon should be used. Some simplification was needed in the Time subdivisions and the Area Table which at present provides a mixture of history and the real world, needed to be tidied up." (FID Internal document, 1990: p. 7)

Appointed as editor-in-chief in 1993, I.C. McIlwaine addressed the challenging task of revision with a team of assistants, until 2006. The core of the editorial team were experienced classificationists: Geoffrey Robinson, at the time editor of the BSI UDC edition, Vanda Broughton, associate editor of the Bliss Bibliographic Classification and Nancy Williamson, a renowned researcher and author in the field of classification who previously worked on a conversion of LCC into a machine readable format.

In the period from 1990 to 2007, 14 versions of the UDC MRF were released,³ and although the plan was to keep the size of the scheme unchanged, the UDC MRF grew from 60,000 to 67,000 records. In this period the following classes were thoroughly revised and expanded with new concepts:

	Common auxiliaries of place (in process 1994-...)	
	Common auxiliaries of time (2003)	
	Common auxiliaries of properties (1999)	
	Common auxiliaries of relations, processes (2003)	
	Common auxiliaries of persons (2001, 2002, 2003)	
004	Computer science	(1994)
005	Management	(2001)
2	Religion	(2000, 2001, 2006)
338.48	Tourism	(1999)
364	Social welfare	(2000)
502/504	Ecology	(1999)
60	Biotechnology	(2002)
61	Medicine (in process)	(1996- ...)
791	Film	(2000)
8	Languages. Literature	(1992)
91	Geography	(1994)
93/94	History	(1994)

In addition, many classes received a quick 'cleaning' of duplications and obsolete concepts, e.g. Common auxiliaries of persons, 37 Education, 64 Domestic sciences, and 712 Architecture. New concepts were added to 51 mathematics, 53 Physics and 78 Music, for example, and special auxiliary tables were revised for 33 Economics.

³ A full summary of all the major changes produced since 1993 can be found at http://www.udcc.org/major_changes.htm

Of all the proposals put forward by the Task Force and adopted in revisions from 1993, the proposal that most affected UDC users was the abolishment of the so-called '10 year rule', which was deemed necessary in order to facilitate the revision task (FID documentation, 1990; McIlwaine, 1990).⁴ This allowed vacated UDC numbers to be immediately re-used to denote different concepts and, hence, put more requirements on the appropriate identification of UDC numbers in the process of classification exchange and update.

Another important aspect of the revision process of this period was the faceting of the UDC. This required research into existing faceted schemes, notably Bliss Bibliographic Classification, in order to explore the possible application of the same structure in UDC. Understandably, any such revision would take more time than usual to complete and show some iterations in the process. Thus, for instance, the first proposal for a fully faceted religion was put forward in 1996 by V. Broughton while the actual new class was introduced in 1999 and it took a further seven years until all main religions were completed. Similarly, the proposal of revising and restructuring Class 61 Medicine in a faceted manner has taken more than ten years to complete.

The experience of the UDC revision process has been described in numerous papers notably by I.C. McIlwaine (1990, 1993, 1995, 1996, 1998), N. Williamson (1990, 1994), G. Robinson (2003) and V. Broughton (1998, 2000). On more than one occasion I.C. McIlwaine noted that it was not always easy to balance users' demands for change and simultaneous complaints against changes because they create problems of retro-compatibility and, thus, additional work for libraries.

Looking back on the revision of the UDC schedules since 1993, it is clear that the recommendations from the Task Force report were followed, especially in transforming revised classes from enumerative towards faceted. The application of facet analysis had an immediate effect on the UDC notation which has become even more expressive. Thus, whenever possible, simple concepts were represented with simple notation and compound and complex concepts have been built by a combination of numbers. In many cases 'faceting' meant a complete restructuring of classes, which led to an entire class being cancelled and replaced by a new faceted schedule. When no other possibility was available, the very same numbers were re-used to express new meanings. This is one of the most inconvenient consequences that revision may cause and class 2 Religion was one in which this could not be avoided.

Another action that had strong impact on UDC was the removal of concept duplications in various tables. This repetition was replaced by the reuse of the same basic notation for building complex subject expressions often using colon combinations thus making notation longer but easier to search, decompose and understand. For instance, one can combine 028.8 Reading. Suggestions for reading and 615.861 Psychotherapy to express 028.8:615.861 Bibliotherapy. Or one can combine 342.7 Fundamental human rights with 612.6 Reproduction (human biology) to express 342.7:612.6 Rights to reproduction. In addition, the introduction, in 1999 and 2003, of common auxiliaries of properties, relations and processes mean that many general and recurring concepts can be cancelled from the main schedules and be represented using the combination with common auxiliaries across all classes. The example that best illustrates these important structural changes is the revision of class 9, introduced in 1994.

914	Geography of Europe	replaced by	91(4)
914.10	Geography of British Isles	replaced by	91(41)
940	History of Europe	replaced by	94(4) " . . . "
941	History of British Isles	replaced by	94(41) " . . . "

⁴ This rule prevented cancelled UDC numbers to be re-used for a period of 10 years, which would give enough time to libraries to reclassify and remove UDC numbers prior to its re-introduction with a new meaning.

Although the expressive notation in which a main number is clearly distinct from a common auxiliary may look at first glance an unnecessary complication, especially for shelf arrangement, the change is logical and advantageous from the point of view of indexing and information retrieval with UDC in an online environment. In both cases the number is built from 94 and common auxiliary of place (4) and (41) respectively but in the old UDC this was achieved through the method known as parallel division. With parallel division, once the number is built the notation is amalgamated in one simple number and the link between the original representation and meaning is lost and the original building elements cannot be retrieved in the process of searching. If components are juxtaposed and remain distinct and clearly marked by expressive notations, the scheme gains important advantages in three aspects:

- a) consistency - the same concept has always the same notational representations and when searching we will be able to find all documents related to the same place or time across different fields of knowledge, e.g. Art, History, Geography, Social Sciences, etc.;
- b) flexibility – with notational elements that are expressive then we can change and alter the citation order of elements the most suitable way for our needs, hence we may choose to have 94"19"(44) or 94(44)"19";
- c) improved verbal accessibility - simple concepts represented with simple notation can be assigned (in a controlled way) verbal expressions, i.e., descriptors that can be used in searching.

As already mentioned, it is not always easy to find a balance for decisions in the revision processes. There are users who ask for urgent revisions and users who find changes disturbing and unnecessary. In the first group are users who use UDC for detailed and complex indexing; these are concerned with the indexing power, logical structure and retrieval capabilities of UDC. The second group are users who use UDC for the simple function of shelf arrangement, i.e. to label books for their location on a book shelf. The latter group may not see the real benefit of a faceted structure or expressive notations, as their only concern is to have the shortest possible string of characters to write on the book spine. For them, the fact that a notation represents a complex combination of concepts is completely irrelevant.

But shelf arrangement is not the only or primary UDC function and the scheme revision is focused on improving the system's indexing power which is of interest to the more demanding users. This is in accordance with the original thinking behind UDC, as a bibliographic and documentary classification system designed for the purpose of detailed indexing and information retrieval. In principle, any downscaling of the scheme for less demanding functions is easier and cheaper if done locally, from a more complex but well structured system. The opposite is far more difficult and expensive. Separate management of shelfmarks and classification authority control is nowadays supported by library systems and is assumed to be good practice in managing and coordinating shelf browsing and subject access.

To sum up, several factors have influenced the thinking behind the revision work since 1990. The radical revision of entire classes and the reuse of UDC numbers were justified by a plan to achieve the whole revision of UDC in ten years, after which the system would be stable and users would be offered an entirely compatible new system to replace the old numbers. The use of longer expressive notations and/or colon combinations to express compound concepts was justified by the fact that in an online environment searching efficiency may be more important than the length of the notation. The speed and volume of changes, and their control, has been considered less problematic in the online use of UDC, especially as schedules are delivered and used in electronic form.

3. Current developments and the future ahead

By the beginning of 2000 it was already clear that the planned ten year period for an overhaul revision of UDC was not realistic when confronted with the size and complexity of the scheme and lack of available resources. As the conditions and complexity of the remaining tasks have not changed, the work on UDC revision will continue at the same pace beyond 2007. Upon the retirement of I.C. McIlwaine in 2006, Maria Inês Cordeiro was appointed the new editor-in-chief and a new editorial team was established. Besides continuing the editorial work of revision, several other aspects called for reorganization. These are primarily issues related to the current users' needs in terms of aligning the management and outputs of UDC to the online environment and the way controlled vocabularies are shared, accessed and implemented in information systems.

Studies of the UDC application areas have revealed that the Web environment and library catalogues offer many cases that justify the use of classification for knowledge browsing and search expansion (Slavic, 2005, 2006, 2006a). Yet this depends strongly on verbal searching and machine readability of data. In particular, there is a need for classification data to be exposed in such a way that the human effort in both implementation and use is reduced to a minimum. This entails the use of UDC not just as 'nominal' data but rather as the 'intelligence' behind the screen, implying that it has to be supported by central vocabulary management systems or, to use library terminology, authority control systems. The first, future requirement for UDCC is to provide the means so that UDC data can be easily ingested by existing systems for vocabulary control or, in practice, new and diversified MRF exports so that it becomes easier and cheaper to implement and use.

Another important area to take into account in future developments is the UDC users' community. Recent research showed that UDC is used in 125 countries and that translations exist in 39 languages. UDC is the main classification system in around thirty countries where UDC training, publishing and user support is usually provided on a regular basis (Slavic, 2008). There is, however, a larger community spread through ninety other countries, where UDC is rarely taught in library schools and for which there may be no recent UDC editions in the local language. While in the 1990s the UDC Consortium was mainly focused on a small number of large users, it is now possible to make use of the global information environment to reach out and support a greater number of UDC users worldwide.

With this background of concerns and ideas, the following lines of action for the future were defined; some of them were already started in 2006:

1. Broadening the editorial team into an internationally based body of collaborators and facilitating closer communication with users;
2. Renewing the technological infrastructure and data management: a new database and editorial support system for UDC, diversification of UDC products and enhancement of UDC data;
3. Updating and structuring policies, guidelines and plans and procedures for revision projects;
4. Fostering translations and UDC training.

In the following sections we will explain the reason and focus of each of these action lines.

3.1 Broadening international support and collaboration

During the long period of FID ownership of UDC, most of the scheme revision and development work was done through the international cooperation and work of central classification committees. Although some final compiling and checking work was remunerated most of the development was an input of volunteers (Scibor & Shcherbina-Samojlova, 1990). To a large extent, this was the same for the period 1993-2006 (McIlwaine, 1998) and the current situation has not changed. The funding annually available for the revision work covers only the part of regular editorial work that consists of minor content development, checking and compilation of revised schedules, editorial control over the

accuracy, consistency, proofreading and publication of *Extensions and Corrections to the UDC*, as well as database updates and release of new MRF versions.

It is, therefore, important to establish collaborative relationships with researchers and subject specialists interested in vocabulary development and who would like to volunteer. In order to make the best of such valuable input, the revision processes have to be carefully planned and managed so to avoid unnecessary overlaps and waste of time and to provide adequate support to volunteers. In 2007, the editor-in-chief renewed the organizational structure of the UDC editorial team, in a way that is best represented as two concentric circles. In the inner circle is a group of six classification specialists working as Associate Editors in close cooperation with the editor-in-chief and who are able to commit some of their time to practical and technical work (creating plans and task lists, checking, proofreading, establishing, supervising and coordinating particular revision projects), plus finding and cooperating with other subject specialists. The outer circle of collaborators consists of the UDC Advisory Board, currently composed of subject specialists from different fields in over twenty countries. Advisory Board members can contribute with expert opinions in specific problems but also by contacting and involving subject specialists in their countries. This renewal of the Advisory Board already produced a valuable input to *Extensions and Corrections to the UDC*, 29 (2007).

Another important aspect of widening of the collaboration is through communication with users and opening more opportunities for networking and discussions. This is planned to be achieved through regular UDC conferences and workshops. The first in the series of UDC Seminars was held in The Hague, in June 2007, entitled *Information Access for the Global Community*.⁵ The Seminar brought together around seventy participants from over thirty countries including librarians, subject specialists, editors and translators of national editions of the scheme, university lecturers, researchers and LIS students. The next Seminar is planned for 2009.

3.2 Renewing the technological infrastructure and data management

The management system of UDC has been based on CDS/ISIS, a textual database distributed by the UNESCO. The system has been used since 1993, when the MRF was established in computer readable form (see Strachan & Oomes, 1995). After more than 13 years of working with a stand-alone CDS/ISIS solution, the UDC Consortium has considered the need for a new system to manage MRF and its outputs with mainstream technologies, notably by making use of a relational database plus Web technologies. A request for proposals was prepared in June 2006, a call for tenders was issued in August and a contract decision was taken by December of the same year. Test versions of the new database are already available and it is expected the new system to be fully operational until April 2008.

The new technological infrastructure will provide the means for a system and data management that will overcome existing limitations and dependencies thus improving the conditions of its permanence, security and transferability. Being based on SQL, the MRF data management and exploitation will be more standard, powerful and flexible.

In terms of workflow, the need has been felt for online collaborative functionalities that would facilitate the processes of UDC revision and maintenance. This is a permanent activity involving groups of people whose coordination should not be limited to face to face meetings, which are less viable than online collaboration. On the other hand, having a system allowing proposals to be posted, discussed and approved in an online mode would make the whole

⁵ Papers from the Seminar are published in *Extensions and Corrections to the UDC*, 29 (2007) and presentations and pre-prints are available from the UDCC website <http://www.udcc.org/seminar2007.htm>.

process less time consuming and prone to error and facilitate more immediate database updates. The new system will comprise all the functionalities for the editorial online collaborative work, encompassing archival functions of such work that were inexistent in the past.

Finally, another major aspect that has also fostered the technological renovation of the UDC data management system has to do with the MRF outputs. There is a need to improve the provision of MRF export formats, i.e. the ways of conveying MRF data to publishers and users. MRF has its own data format and has been distributed annually in the form of ASCII and/or ISO 2709 files. Diversifying the outputs and making them more amenable to current technologies is of utmost importance for the portability, reusability, wider distribution and application of UDC data.

UDC publishers use MRF for preparing print or electronic editions, each having to build and maintain local tools to process MRF data according to their needs and purposes. The existing export formats either reduce complexity by almost completely removing the data structure (as with current ASCII exports) or, to use the data structure, they imply additional specialist knowledge (namely of ISO 2709), which is not mainstream. A current way to facilitate the use of specialist data such as UDC by different information and technological communities is to have it exported in XML, thus opening such data to processing by a variety of XML tools.

Some libraries use MRF to feed their authority files or systems of a similar function and many others would like to load UDC data upfront, to make the indexing language available online to the cataloguer instead of the traditional manual input. For the import of MRF data, ISO 2709 knowledge is usually available in library systems, but the syntax/semantics of MRF have nothing in common with MARC formats, therefore requiring always the definition and maintenance of mappings and conversion programs, an effort repeated wherever that is needed. In order to overcome these inconveniences UNIMARC and MARC21 exports of UDC data should be provided, according to the MARC21 and UNIMARC Classification Formats (IFLA, 2000; Library of Congress, 2005) and their XML expressions, in conformance with MARCXchange (ISO/DIS, 2006).

For the above reasons, the new UDC editorial support system is aimed at diversifying the UDC exports, notably in MARC and XML, in addition to the exports provided so far. This strategy should be followed by exports according to SKOS Core (XML/RDF)⁶ and XML Topic Maps (ISO/IEC, 2003-2006), at a later stage (Cordeiro & Riesthuis, 2006; Slavic, Cordeiro & Riesthuis, 2007).

The strategy of the UDCC in renewing the technological infrastructure of the UDC MRF is wider than just the modernization of the database and its exports and the renovation of the very processes of collaboration. The strategy also encompasses the consolidation and enhancement of the data itself. In this respect, the migration to the new system will be accompanied by improvements to the MRF data element set and actions of cleaning-up and correction regarding data consistency, a need that has been felt for some time. Improvements to the MRF format have been discussed for some time (Riesthuis, 2003) and include both the addition of new fields and changes to existing fields. Provisions will be made for the existence of:

⁶ SKOS Core – *Simple Knowledge Organization System* is a W3C specification for exchange of knowledge organization systems such as thesauri and classifications, using XML/RDF syntax (Miles & Brickley, eds., 2005).

- a unique identifier for each UDC number, in order to maintain database consistency in between versions, exports, etc. and for the MRF to function as a true UDC Registry;
- an alternative formatting of the existing notation field, by subfielding its content in order to enable computer-readability of the individual components of a complex UDC notation;
- a new field for Hierarchical next higher notation, needed to ensure completeness of the information for the system to build correctly the hierarchical chains, because there are many cases throughout the UDC schedules where the simple rule of omitting the last digit is not applicable;
- a new field for the explicit record of all the special auxiliaries applicable with a given UDC notation; so far, this information is recorded as a textual note and in a single point of the hierarchy only ;
- a new field for Index entries, to include terms relevant for retrieval that do not appear in the class Description (caption) but also a sub-field for subject-alphabetical entry
- a language code for all textual data which would enable multilingual representation of the same content
- a mapping field(s) that would allow mapping to other indexing languages

The overall aim is, thus, to improve the quality and consistency of existing data, facilitate its full deployment and extend its potential with new features such as multilingual support and mappings to other subject representation schemes.

3.3 Policies, guidelines and procedures for revision

Efforts will start in 2008 to revise, improve and consolidate documentation on revision policies, guidelines and procedures. This is needed not just because there are always policy aspects to discuss but also because there is a real need to detail some of the editorial criteria and, especially, to establish clear procedures now that we expect a wider group of people to contribute. In order to facilitate the collaborative international work and make the most of the valuable time of contributors, revision policies and procedures have to be clearly explained and practical and detailed instructions for different types of work on the scheme will be needed.

This will be easier as soon as the new Editorial Support System is made available, during 2008. Associate Editors and Advisory Board members will have online access to schedules, documentation, related vocabularies etc., as well as to Web collaborative applications dedicated to revision tasks. The new editorial system will allow proposals to be posted, discussed and approved online and will make the process of revision more efficient with the fully managed workflow allowing immediate database updates.

In order to foster advancement in these two aspects, a UDC editorial workshop is planned for 2008 aimed at discussing policy, priorities, plans and guidelines for revision as well as to introduce contributors to the facilities of the new online UDC Editorial Support System.

3.4 Facilitating translations and training

Translating UDC is an expensive and time consuming activity and for many countries with few users, publishers may not have the incentive to produce new editions. One way to overcome this and to help users is to encourage voluntary work by providing affordable access to the UDC MRF to stakeholders who are willing to undertake the work of translation on a not-for-profit basis. A good example of such an effort is the Swedish abridged online

edition of around 6,000 UDC numbers which is produced by the library school in Boras purely on the voluntary and a not-for-profit basis, mainly for training.

Similarly, at the UDC Seminar 2007 that took place in June 2007 in The Hague, concerns were expressed in relation to the lack of a German edition for which the UDC Consortium has not been able to find an interested publisher. Action was taken immediately and on its June meeting 2007 the UDC Consortium decided to lend support to an international project of German translation by providing access to the UDC MRF to volunteers who may like to get involved. In the following months, records from the German UDC dating from 1989 were collected resulting in 31,000 records of the current MRF for which there is already a German version. In order to facilitate the translation of the rest of the scheme volunteers are invited and the first step forward was the creation of a translation tool which will be made available for free to all stakeholders who would like to contribute.

The support of training is yet another major issue that the editorial team feels should be addressed in the future in order to retain and expand the UDC users' base. Until now it was left to publishers of editions in different languages who are members of the UDC Consortium to decide whether they want to produce training materials or give some kind of discount for their products to library schools. It is now felt that the UDC Consortium should provide instructional materials and possibly that some should be made available online for free so that library schools have access to good quality, up-to-date information about the system.

4 Conclusion

In this paper we have provided an overview of the history of UDC development and revision as this knowledge is important for understanding what is happening with and targeted for the future of the classification system. One important commitment of the new editorial team is to help users understand what is happening with the UDC, what the advantages and benefits are in all changes and how they can be better exploited.

The main objective of the maintenance and development policy of the UDC in the years to come is to continue the work started in 1993 to bring the entire system up-to-date. In doing so, the plan is also to improve control over changes and their consistency across the system and to ensure that users are fully supported in automatically tracking and implementing these changes in their environment. Additionally, efforts will be made towards providing the system with an alphabetical index and mappings to other subject systems in order to enhance its power in indexing and retrieval. The main idea behind the new enriched data and standardized exports is lowering production and implementation costs of UDC as well as increase value for money on all UDC products.

References

BROUGHTON, V. (1998) The revision process in UDC: an examination of the systematic auxiliary of 'Point of View' using facet-analytical methods, *Extensions and Corrections to the UDC*, 20, 17-20.

BROUGHTON, V. (2000) A new classification for the literature of religion. Paper presented at *66th IFLA Council and General Conference, Jerusalem, Israel, 13-18 August 2000*. Available at <http://www.ifla.org/IV/ifla66/papers/034-130e.htm>

CORDEIRO, M.I.; RIESTHUIS, G. J. A. (2006) A new editorial support system for UDC, *Extensions and Corrections to the UDC*, 28, 17-22.

DAHLBERG, I. (1971) Possibilities for a new Universal Decimal Classification, *Journal of Documentation*, 27 (1), 18-36.

FID Internal Documentation (1976). UDC reform work. C 75-35. The Hague.

- FID Internal Documentation (1990) Task Force For System Development: final report. The Hague.
- FID Internal Documentation (1991) Guidelines for the creation of a standard version of UDC. [UDC-CONS 91-54, UDC Ref. 91-5]. The Hague.
- FOSKETT, A. C. (1973) The Universal Decimal Classification : the history, present status and future prospects of a large general classification scheme. London : Clive Bingley.
- FREEMAN, R. R.; ATHERTON, P. (1969) Final report of the research project for the evaluation of the UDC as the indexing language for a mechanized retrieval system. In: *Proceedings of the First Seminar on UDC in a Mechanized Retrieval System conducted by R. R. Freeman and P. Atherton, Copenhagen, 2nd-6th September, 1968*. Copenhagen: Danish Centre for Documentation, 1969. (FID/CR Report no 9), 29-37.
- GILCHRIST, A. (1992) UDC : the 1990s and beyond. In: *Classification research for knowledge representation and organization : proceedings of the 5th International Study Conference on Classification Research, Toronto, Canada, 24-28 June 1991*. Eds N. J. Williamson, M. Hudon. Amsterdam : Elsevier Science Publishers; The Hague : FID, 69-78.
- IFLA (2000) Concise UNIMARC Classification Format. Available at: <http://www.ifla.org/VI/3/p1996-1/concise.htm>.
- ISO/DIS 25577 (2006) Information and documentation – MarcXchange. Geneva: ISO. (draft standard: <http://www.bs.dk/marcxchange/>).
- ISO/IEC 13250 (2003-2007) Information technology. SGML applications. Topic maps: Part 1-3 (13250-1, 13250-2, 13250-3). Geneva: ISO.
- KYLE, B. (1961) The UDC : a study of the present position and of its future developments, with particular attention to those schedules which deal with the humanities, arts, and social sciences, *UNESCO Bulletin for Libraries*, 15 (2), 53-69.
- LIBRARY OF CONGRESS (2005) MARC 21 Concise Format for Classification Data. Library of Congress. Network Development and MARC Standards Office. Available at: http://www.loc.gov/marc/concise/concise.html#general_intro.
- LLOYD, G. A. (1971) Why this Seminar? : keynote address to the Seminar. In: *Proceedings of the Second Seminar on UDC in Mechanized Information Systems conducted by R. R. Freeman, Frankfurt, 1st -5th June, 1970*. Copenhagen : Danish Centre for Documentation, 1971. (FID/CR Report no 11), 1-2.
- LLOYD, G. A. (1972) UDC : revise or relegate? : FID's Standard Reference Code project and UDC improvement programme, *Aslib Proceedings*, 24 (10), 580-587.
- McILWAINE, I. C. (1990) The work of the System Development Task Force. In: *The UDC : essays for a new decade*. Edited by A. Gilchrist, D. Strachan. London : Aslib, 19-28.
- McILWAINE, I. C. (1993) UDC : the present state and future development. Paper presented at *59th IFLA Council and Conference, Barcelona, Spain 22-28 August 1993*, booklet 4, 37-39.
- McILWAINE, I. C. (1995) UDC centenary : the present state and future prospects, *Knowledge Organization*, 22 (2), 64-69.
- McILWAINE, I. C. (1996) New wine in old bottles : problems of maintaining classification schemes. In: *Knowledge organization and change : proceedings of the Fourth International ISKO Conference, 15-18 July 1996, Washington DC*. Eds. R. Green. Frankfurt/Main : Indeks Verlag, 122-136.
- McILWAINE, I. C. (1998) The Universal Decimal Classification : some factors concerning its origins, development, and influence. In: *Historical studies in information science*. Eds. T. B. Hahn, M. Buckland. Medford, NJ : Information Today, 94-106.

McILWAINE, I. C.; WILLIAMSON, N. J. (1994) A feasibility study on the restructuring of the Universal Decimal Classification into a fully-faceted classification system. In: *Knowledge organization and quality management : proceedings of the Third International ISKO Conference, 20-24 June 1994, Copenhagen, Denmark*. Eds. H. Albrechtsen, S. Oernager. Frankfurt: Indeks Verlag, 406-413.

MILES, A. ; BRICKLEY, D., eds. (2005) SKOS core guide.
Available at: <http://www.w3.org/TR/swbp-skos-core-guide/>.

NEELAMEGHAN, A. (1976) A theoretical foundation for UDC : its need and formulation. In: *Proceedings of the international symposium "UDC in Relation to Other Indexing Languages" held in Herceg Novi, Yugoslavia, June 28-July 1, 1971*. Beograd : Jugoslovenski centar za tehnicku i naucnu dokumentaciju; The Hague : FID, 137-173.

NEWCOMBE, D. (1972) SRC : unverified assumptions, *Aslib Proceedings*, 24 (10), 587-590.

RIESTHUIS, G. (2003) A revised format for the Master Reference File, *Extensions and Corrections to the UDC*, 25, 11-18.

RIGBY, M. (1971) The role of the UDC in automated information and data systems. In: *Proceedings of the Second Seminar on UDC in Mechanized Information Systems conducted by R. R. Freeman, Frankfurt, 1st -5th June, 1970*. Copenhagen : Danish Centre for Documentation, 1971. (FID/CR Report no 11), 182-192.

ŠCIBOR, E.; SHCHERBINA-SAMOJLOVA, I. S. (1990) A strategic approach to revising the UDC. In: *The UDC : essays for a new decade*. Eds. A. Gilchrist, D. Strachan. London : Aslib, 11-18.

SLAVIC, A. (2005) The use of classification in the networked environment: the case of UDC. PhD thesis. University of London, University College London, 2005. [Available at the University of London Library and University College London Library]

SLAVIC, A. (2006) The level of use of Universal Decimal Classification in library OPACs: pilot study 2004– 2005 [Razina korištenja UDK u knjižničnim OPAC-ima: pilot istraživanje 2004–2005]. *Vjesnik bibliotekara Hrvatske*, 49, 3–4, 149–168. Also available at: <http://www.hkdrustvo.hr/vbh/broj/94> [Croatian] and <http://dlist.sir.arizona.edu/1688/> [English].

SLAVIC, A. (2006a) UDC in subject gateways: experiment or opportunity? *Knowledge Organization*, 33 (2), 67-85. Also available at: <http://dlist.sir.arizona.edu/1556/>.

SLAVIC, A.; CORDEIRO, M. I.; RIESTHUIS (2007) Enhancement of UDC data for use and sharing in a networked environment. Paper presented at the *Librarian Workshop in conjunction with The 31st Annual Conference of the German Classification Society on Data Analysis, Machine Learning, and Applications, March 7-9, 2007, Freiburg i. Br., Germany*. Available at: <http://dlist.sir.arizona.edu/2093/>

SLAVIC, A. (2008): Use of the Universal Decimal Classification: a worldwide survey, *Journal of Documentation*, 64 (2) [in print]. Pre-print available at: <http://dlist.sir.arizona.edu/1555/>

STRACHAN, D.; OOMES, F. M. H. (1995) Universal Decimal Classification update, *Cataloging and Classification Quarterly*, 19 (3-4), 119-131.

VICKERY, B. C. (1961) The Universal Decimal Classification and technical information indexing, *UNESCO Bulletin for Libraries*, 15 (3), 126-138.

WELLISCH, H. (1971) Reorganization of the UDC, *Nachrichten für Dokumentation*, 22 (2), 55-63.

WILLIAMSON, N. J. (1990) The UDC : its future. In: *The UDC : essays for a new decade*. Eds. A. Gilchrist, D. Strachan. London : Aslib, 29-32.

WILLIAMSON, N. J. (1994) The future revision of the UDC", *Extensions & Corrections to the UDC*, 16, 19-27.