The Dewey Decimal Classification at 120: Edition 21 and Beyond

Abstract: The twenty-first edition of the Dewey Decimal Classification system will be published in summer 1996, 120 years after the publication of the first edition. This paper describes the major changes in Edition 21 and explores some of the social, cultural, political, disciplinary, and knowledge organization forces behind the changes. The print version of Edition 21 is one manifestation of a larger underlying database that has also responded to several forces to meet present and future needs. Developments in the database and future directions to meet new uses of the Dewey Decimal Classification are addressed.

1. Introduction
The twenty-first edition of the Dewey Decimal Classification system (DDC) will be published in summer 1996, 120 years after the publication of the first edition (Dewey, 1996). The basic outline of main classes and divisions has changed little since the first edition; below the hundred divisions, however, much has been transformed and developed to keep pace with knowledge and with social, cultural, and political changes. Compared with its most recent predecessor, Edition 20 (Dewey, 1989), Edition 21 contains substantial changes in the organization of several disciplines. It provides expansions for new areas of knowledge, accommodates many political and social changes, and includes updated terminology. Edition 21 also features several structural changes that reflect modern classification theory and make the Classification easier to apply. The print version of Edition 21 is derived from a larger underlying database that also contains several changes to provide for current and future needs.

2. Major Revisions: Public Administration, Education, Life Sciences
In the DDC, keeping pace with knowledge means accommodating new topics, as well as revising existing schedules. Schedules are revised to reflect new views of the field, to provide for new topics, and to correct existing problems in bias and structure. Edition 21 includes three major revisions: 350-354 Public administration, 370 Education, and 560-590 Life sciences. The changes in public administration and education have been underway for more than a decade; the changes in the life sciences for more than two. Each reflects basic changes in the respective discipline over time.

Public administration is completely revised. The schedule still occupies 351-354, but the subdivisions and citation order have been changed. The revision addresses a longstanding problem with U.S. bias in structure and terminology. For example, compare the outline in Edition 21 (emphasis on topic) versus Edition 20 (emphasis on jurisdiction, especially U.S.) in figure 1.

In the new public administration schedule, citation order is reversed from jurisdiction/topic to topic/jurisdiction. This was done to reflect the shift in the literature of the discipline away from jurisdiction to topic as the central emphasis. The citation order is retroactive; in general, the classifier uses a number later in the schedule as the base number,

<table>
<thead>
<tr>
<th>Edition 21</th>
<th>Edition 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>Public administration and military science</td>
</tr>
<tr>
<td>351</td>
<td>Public administration</td>
</tr>
<tr>
<td>352</td>
<td>General consideration of public administration</td>
</tr>
<tr>
<td>353</td>
<td>Specific fields of public administration</td>
</tr>
<tr>
<td>354</td>
<td>Public administration of economy and environment</td>
</tr>
</tbody>
</table>

| Edition 20 | Public administration of central governments |
| Administration of local governments |
| Administration of U.S. federal and state governments |
| Administration of specific central governments; international administration |

Fig 1: Comparison of 350-354 in Edition 21 vs. Edition 20

and then adds as instructed from numbers coming earlier in the sequence. For example:

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Rural administration of irrigation projects in Australia: 354.3672170994
354.367 Irrigation projects
2 Facet indicator for General considerations (from internal table under 352-354)
17 Rural administration (from 352.17 Rural administration)
09 Facet indicator for Geographic treatment (Table 1)
94 Australia (Table 2)
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In the example above, citation order is topic (irrigation projects) + jurisdiction (rural administration) + specific area. Each element after the base number is introduced by a facet indicator. The digit "2" (from 352 General considerations) is used as a facet indicator for adding topics from 352 to base numbers later in the sequence (including other numbers in 352).

370 Education represents an extensive revision. This means that the main outline of the schedule has remained the same, but some subdivisions have been reworked and expansions provided for new topics. The most visible changes, the relocation of 376 Education of women and 377 Schools and religion, are responses to social and disciplinary changes. The revised schedule reflects the current view in the discipline of education that each of these topics is an aspect of a broader topic (i.e., kind of student and type of school, respectively) rather than a central division of education. For example:

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371.82 Specific kinds of students; schools for specific kinds of students
Add to base number 371.82 the numbers following --08 in notation 081-089 from Table 1, e.g., education of women 371.822 [formerly 376], education of students by racial, ethnic, national origin 371.829 . . .
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In Edition 21, the number for the education of women (371.822) shares the same base number (371.82) as the education of other kinds of persons, e.g., girls 371.823, Asian Americans 371.82995073.

Religious schools have moved from class 377 to within class 371 as an aspect of types of schools. For example:
3. Changes in Religion, Areas, and Historical Periods

In addition to the three major revisions of disciplines described above, there have been numerous other changes to address cultural, social, and political issues. With Edition 21, we have initiated a multi-edition plan to further reduce Christian bias in 200 Religion. As a first step, we have relocated the standard subdivisions of Christianity in 201-209 to 230-270. The standard subdivisions of comparative religion are now integrated with the standard subdivisions of religion in 200.1-200.9. We have revised and expanded the schedules for two major religions: 296 Judaism and 297 Islam. A new optional arrangement for books of Tanakh (222-224) has been added to the note for 221 in the Manual.

The impact of political flux on Dewey is perhaps most evident in Table 2 and the 900s. There are numerous adjustments in Edition 21 to reflect political changes, e.g., the revision of the area table for Bulgaria, the major revision of the area table for the countries of the former Soviet Union, a new historical period for the administration of Nelson Mandela. We have worked with national libraries and other groups to prepare revisions of the area tables for Brazil, Colombia, Greece, New Zealand, Nigeria, and Norway. Even as we publish Edition 21, we are working on a revision of the South Africa area table to reflect recent changes in the political divisions of the country.

4. Accommodation of New Topics and Relationships

Many new topics that have gained literary warrant since the publication of Edition 20 are now mentioned in Edition 21, e.g., virtual reality, rap music, Internet, in-line skating, snowboarding. In addition to new topics, the Classification also accommodates new relationships within and across disciplines. These relationships are explained in the notational hierarchy; through notes in the schedules, tables, and Manual; and in entries in the Relative Index.

The Internet serves as a good example of a cross-disciplinary topic for which new links must be introduced in the Classification. Edition 21 includes a new number in computer science,
004.678, for the Internet. This number also serves as the interdisciplinary number for works on the Internet. An extensive Manual note on the Internet at "004.678 vs. 025.04, 384.33" explains the relationship of the computer science/interdisciplinary number with numbers in other schedules:

Class computer science works about the Internet that are wholly or predominantly about communications software in 005.713, e.g., works emphasizing software packages for connecting to the Internet or emphasizing the commands needed for electronic mail, FTP, and telnet. Class in 025.04 interdisciplinary works about the Internet that do not contain enough computer science material to be classified in 004.678, but do contain some information science material. Class in 025.04 information science works that emphasize search and retrieval, including use of front-end systems and interfaces such as Gopher and Netscape® to facilitate search and retrieval on the Internet. Also class in 025.04 works that describe information resources on the Internet. Class in 384.33 works on Internet access providers and works on economic and public policy issues concerning the Internet.

This Manual note makes explicit what is summarized in the schedules and Relative Index. In the schedules, there are references to the Manual from each of the three numbers in the entry for the Manual note. At 004.6 Interfacing and communications (a broader number in the hierarchy for 004.678), 004.6 is identified as the interdisciplinary numbers for computer communications, with references leading to 005.7 and 384.3. The Relative Index also summarizes the relationship among the numbers. It includes two entries for the Internet:

<table>
<thead>
<tr>
<th>Internet</th>
<th>004.678</th>
</tr>
</thead>
<tbody>
<tr>
<td>see also Computer communications</td>
<td></td>
</tr>
<tr>
<td>see Manual at 004.678 vs. 025.04, 384.33</td>
<td></td>
</tr>
</tbody>
</table>

Internet resources 025.04

The index entry for Computer communications, to which there is a see-also reference from the index entry for Internet, includes subentries for communications services (384.33) and programs (005.713).

5. Terminology

Terminology throughout the Classification has been updated to achieve currency, ensure sensitivity, and reflect international usage. Many of the changes in terminology have resulted from a concerted effort to provide descriptive representations in the schedules of persons, social groups, national groups, etc., using the terminology preferred by the group and understood by an international audience. To this end, some of the transformations in terminology that have taken place in the schedules and tables include:

- Gypsies >> Romany people
- Handicapped children >> Children with disabilities
- Old persons >> Older persons
- Sick and infirm >> Persons with illnesses and disabilities

Since the Classification is used by different kinds of libraries throughout the world, Edition 21 includes several changes to address international or special needs. For example, the Relative Index includes numerous entries for English-language terminology in use outside of the United
States (e.g., A level examination, School leavers). The Manual note for specific levels of education (372.24 and 373.23) explains the dividing lines between elementary and secondary education using the grade in school and four sample patterns. The aforementioned optional arrangement for books of Tanakh provides alternate notation for libraries preferring arrangement of the Old Testament as found in the Jewish Bible.

6. Structural Changes

Edition 21 also includes several structural changes. In recent editions, we have made a conscious move away from enumeration in the schedules. Where possible, special developments for standard subdivision concepts have been replaced by regular use of standard subdivisions found in Table 1. For example, the development at 370.7 Education, research, related topics now matches the development of --07 in Table 1. The special development for geographic distribution of temperature at the earth's surface has been moved from 551.5252 to regular use of --09 at 551.525.

In Edition 20, the development for 780 Music was highly faceted; 351 Public administration and 570 Life sciences continue this trend in Edition 21. The earlier example on rural administration of irrigation projects in Australia highlighted notational synthesis and the use of facet indicators in 351 Public administration. The 570 schedule also features notational synthesis and facet indicators. For example:

<table>
<thead>
<tr>
<th>Concept</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytopathology</td>
<td>571.93619352</td>
</tr>
<tr>
<td>Generalities</td>
<td>571.93</td>
</tr>
<tr>
<td>Cytopathology</td>
<td>6</td>
</tr>
<tr>
<td>Facet indicator</td>
<td>1</td>
</tr>
<tr>
<td>Rattus</td>
<td>9352</td>
</tr>
<tr>
<td>(from 571.6)</td>
<td></td>
</tr>
<tr>
<td>(from 571.1)</td>
<td></td>
</tr>
<tr>
<td>(from 599.352)</td>
<td></td>
</tr>
</tbody>
</table>

Why is notational synthesis important? First, it makes Dewey more hospitable to the specification of emerging topics. Second, it promotes improved information retrieval. The use of facet indicators to identify meaningful components in a number and the use of uniform notation to express recurring aspects of topics within a schedule expand retrieval possibilities by providing access to information represented by parts of a number. Liu (1993) demonstrated the feasibility of "decomposing" Dewey numbers into their component parts; research remains to be done to explore the use of Dewey facets in information retrieval.

We have made a conscious effort in Edition 21 to reduce adjectival headings, prepositional phrases, and many vague headings. Why is this change important? Within the print edition, it is relatively easy to glance at the page header or up the hierarchy on a page to put a heading in context. When schedules are used in an electronic environment, the individual records have no context unless viewed in separate page displays or hierarchical displays (see Beall, 1996 for a description of displays for viewing hierarchies in Dewey for Windows). During the last two years, we have seen an increasing use of the Classification in other venues, e.g., the DDC summaries have been used by several sites to organize World-Wide Web resources. Such uses often employ the Dewey summaries without the accompanying note structure, and include captions with obscure meanings (e.g., 000 Generalities). I will return to this topic in section 8.

Other structural changes include simplification of the note structure and expansion of the Relative Index. The note structure in the schedules has been simplified by replacing "example" and "contains" notes with an existing note type, the "including" note. In addition, "standard-
subdivisions-are-added notes" have been introduced in many entries with multiterm captions to make clear which topics approximate the whole of the concept represented by the number. For example:

542.6 Filtering and dialysis
Standard subdivisions are added for either or both topics in heading

The Relative Index includes more terms and entries for selected built (synthesized) numbers, terms to provide entry vocabulary for international users, and index entries for Manual notes. We have continued the identification of interdisciplinary numbers in the schedules and Relative Index.

7. The DDC Database

Many of the structural changes in the Classification are motivated by present and future uses of the underlying database. The Dewey Decimal Classification database currently serves as the basis for the standard English-language print and electronic editions, translations, and various research projects. The electronic database of the DDC was first created by Inforonics in 1984 from the phototypesetting tapes used to produce Edition 19. Edition 20 was the first edition prepared using the Editorial Support System (ESS), a UNIX-based system with DDC-specific fields developed by Inforonics under contract with Forest Press. Before work began on Edition 21, several fields in the ESS were modified or added to accommodate elements in the USMARC Format for Classification Data (Library of Congress, 1991; for a full description of changes, see Beall, 1992). The motivation for the modifications was to permit the eventual import and export of data in the MARC format while retaining the DDC-specific record structure in the ESS.

One of the new fields in the Edition 21 database is the 685 history field. The 685 history field has been used in the Edition 21 database to document the history of many expanded, relocated, and discontinued numbers from Editions 19 to 20, and Editions 20 to 21. This information could be used in online systems to guide users to relevant information split between former and current numbers.

Another change in the database is the incorporation of selected Library of Congress subject headings. Library of Congress subject headings have always been a source for terminology in the Relative Index, but their inclusion depends upon literary warrant for the concept and compatibility with the rules for Relative Index entries. Electronic Dewey (1994), a DOS version of Edition 20, features frequently used LC subject headings derived from records in the OCLC Online Union Catalog (OLUC) and mapped to Dewey numbers. Dewey for Windows (1996) also includes statistically mapped LC subject headings. However, such mappings are not available for the major revisions in Edition 21. In preparation for the first Dewey for Windows database, selected LC subject headings have been entered into the DDC database. Experimental coding has been developed to describe the relationship between the heading and the number to which it is mapped:

(1) This heading points to this number exclusively
In most cases (~ 90% of the time), this subject heading will map to this number alone
Example: Education, Humanistic to 370.112 Humanistic (Liberal) education
This information may be incorporated later into a classifier's assistance tool for *Dewey for Windows* and other products.

8. Future Directions

We are moving towards a model of the Classification that views the DDC database as the central resource from which products may be derived and/or developed. The print edition is an example of a derived product; it includes much, but not all, of the information in the DDC database. The print version of the Relative Index is a subset without the additional terminology and mapped terms found in the electronic version. *Dewey for Windows* is an example of a product derived from the database and then further developed. Can the DDC database be used to develop representations of the Dewey structure in ways other than those found in the current print and electronic editions? Cochrane and Johnson (1996) suggest one approach using amplified captions without DDC notation. Vizine-Goetz (1996) is experimenting with revamped DDC summaries to serve as a browser for a database of Internet resources.

Over a decade ago, Svenonius (1983) highlighted the potential of classification as a switching language. Edition 20 has been translated into Italian, Spanish, and Turkish. An intermediate French edition based on Abridged Edition 12 with selected additions from Edition 20 has also been published. The first three translations are very close in structure and content to the English-language standard edition with minor cultural adaptations. A translation of Edition 21 by the Russian National Public Library for Science and Technology is already underway. As a first step towards Svenonius's vision, OCLC Research is developing a prototype multilingual browser based on the summaries of the English, French, Spanish, and Russian editions (Vizine-Goetz and Mitchell, 1996).

What is the core of Dewey? It is the hierarchical structure and defined relationships. The hierarchical structure gives context to any topic; the defined relationships allow one to move within and across disciplines. The derived products, new representations, and linkages do not change the core of Dewey; instead, they enable us to address users' needs in a variety of ways and complement our efforts within the database to keep pace with knowledge.

Notes

1. The Dewey home page (http://www.oclc.org/lp/) has links to Internet resources organized by DDC. Some examples include:
   "CyberDewey" (http://ivory.lm.com/~mundie/DDHC/DDH.html)
   "Gnosis" (http://www.slac.stanford.edu/~clancey/dewey.html)
   "The Morton Grove Online WEBrary" (http://www.nslsilius.org/mgkhome/orrs/webrary.html)
References


