Abstract
This paper explores the feasibility of developing mixed translations of the Dewey Decimal Classification (DDC) system in countries/language groups where English enjoys wide use in academic and social discourse. A mixed translation uses existing DDC data in the vernacular plus additional data from the English-language full edition of the DDC to form a single mixed edition. Two approaches to mixed translations using Norwegian/English and Swedish/English DDC data are described, along with the design of a pilot study to evaluate use of a mixed translation as a classifier’s tool.

Introduction
Translations of the Dewey Decimal Classification (DDC) system are undertaken by authorized agencies around the world to produce localized representations of the DDC in which classes remain interoperable with the English-language edition on which the translation is based. Translations are localized with examples and terminology appropriate to the country/language group, and are often supplemented by interoperable expansions (e.g., a deeper representation of a geographic area than found in the English-language full edition). Beall (2003) discusses such expansions in detail, and provides several examples from the German and Vietnamese translations of the DDC.

We are exploring models for developing mixed translations of the Dewey Decimal Classification (DDC) system in countries/language groups where English enjoys wide use in academic and social discourse. A mixed translation uses existing DDC data in the vernacular plus English-language classes from the full edition to form a single edition. It is not a bilingual edition in the sense of parallel records in both languages; English-language classes will supplement classes in the vernacular. In some cases (e.g., geographic areas, history), developments in the vernacular will be in the form of interoperable expansions of their English-language equivalents (i.e., developments in which the English-language version is a logical abridgment of the expansion in the vernacular).

Why consider a mixed translation? A mixed translation might speed the translation process and make the translation easier to maintain. In general, the deepest levels of the mixed translation (with the exceptions noted previously) would be in English. The majority of updates to the DDC occur in classes subordinate to those found in the English-language abridged edition. Presumably, it would be easier to keep a mixed translation up-to-date by ingesting English-language records directly at deeper levels without going through the intermediate step of translation. The anticipated productivity gains in the development/maintenance of a mixed translation must be weighed against the usability of a mixed translation as a classifier’s tool and in end-user facing applications.

We are investigating the development of mixed translations through two case studies—a Norwegian-English mixed translation and a Swedish-English mixed translation. The two approaches share a number of common features. Both will use existing DDC data in the vernacular to form the base edition plus English-language data from the full edition of Dewey. Both will feature interoperable expansions in the vernacular in key ar-
Norwegian Model

There is a long history of use of the DDC in Norway dating back more than a century (Knutsen 2003). Current vernacular DDC content in Norwegian includes the 5th edition of Dewey’s Desimalklassifikasjon (Dewey 2002), a customized abridgment of DDC 21 commonly known as “DDK 5,” and the Norwegian translation of the DDC Summaries from DDC 22.¹ The Norwegian model starts with the level of notation presented in DDK 5 as the framework for the vernacular content. The DDK 5 captions and notes will be revised to reflect the contents of equivalent classes in DDC 22. DDK 5 contains some long-standing alternative developments in geographic areas and history that will be addressed simultaneously in the English-language full edition and Norwegian content. Additionally, DDK 5 includes an optional arrangement for the law of Norway (based on one of the standard options presented in DDC 21); this will need special accommodation.

We plan a similar approach in the tables. DDK 5 currently contains Tables 1–7;² Tables 3A–3C are collapsed into a single table similar to the one found in the abridged edition of the DDC. We will expand Tables 1–6 with English-language entries, but will include an interoperable version of the expansion for Norway in the vernacular content for Table 2. We will convert Table 3 into Tables 3A–3C.

The index to DDK 5 will serve as the basis for the Norwegian index, but full numbers will be included with segmentation marks to show logical abridgment. The English-language index will be included as a second index.

Swedish Model

Adoption of the DDC is currently under exploration in Sweden. Some vernacular DDC content already exists in Swedish—a mapping between the Swedish classification system (“SAB”) and DDC 21 schedule numbers (Gustavsson 2000), and a Swedish translation of the DDC Summaries from DDC 22.³ In a 2006 study, the National Library of Sweden explored the idea of a Swedish translation of the DDC (Svanberg 2006a, 2006b). There was general interest in a translation, but the abridged edition was rejected as too brief and the full edition as too detailed. It was also felt that a customized abridgment similar to DDK 5 would potentially create problems for interoperability and might be too time consuming to develop and maintain. A mixed Swedish-English translation arose as a possible solution.

The initial version will use the level of notation in the abridged edition of the DDC plus categories found in SAB as the guide for the categories to be translated into Swedish. Additional categories will be translated as needed based on literary warrant in Libris, the Swedish union catalog. English-language records will be added for the rest of the entries.

¹ The DDC Summaries are available in Norwegian (Norsk) at: http://deweyresearch.oclc.org/ddcbrowser2/index_nor.html.
² Table 7 was deleted in DDC 22 and replaced by notation derived directly from 001–999.
³ The DDC Summaries are available in Swedish (Svenska) at: http://deweyresearch.oclc.org/ddcbrowser2/index_swe.html.
The Swedish model will include full translations of Tables 1–6 into Swedish (with the exception of parts of Table 2, e.g., counties in the United States will remain in English). Eventually, additional vernacular content in the form of interoperable expansions in Table 2, history, and other areas of Swedish interest will be developed and added to the translation.

The mixed translation will include the full English-language index. Svenska ämnesord (the Swedish subject heading system) includes links to equivalent LC subject headings. We plan to investigate using this data to develop a mapping between Svenska ämnesord and Dewey. The Swedish subject headings could serve as entry vocabulary into the system, and as a possible basis for the development of the Swedish-language index. Swedish subject headings might not reflect the disciplinary focus of different Dewey numbers, but this could be addressed by including captions with the Dewey numbers under each Swedish subject heading.

Methodology
As a first step, we modeled two sets of number/caption pairs to illustrate the Norwegian and Swedish approaches. The first set is drawn from 370 Education. Figure 1 contains vernacular Norwegian data from DDK 5 (in bold) extended by English-language classes. Figure 2 contains vernacular Swedish data drawn from SAB / DDC 21 mappings (in bold) extended by English-language classes.

Note the Swedish-English mixed translation in figure 2 contains more classes in the vernacular than the Norwegian-English version in figure 1. This is because the Norwegian classes were pre-selected by the Norwegian translation team to form a specific level of abridgment in DDK 5, while the Swedish classes were derived from mappings between SAB and DDC 21 without pre-selection to form a cohesive Swedish version of the DDC.

The second set of number/caption pairs is drawn from 576 Genetics and evolution. In these examples, the vernacular content is at the same level in the Norwegian-English (fig. 3) and Swedish-English (fig. 4) versions. Since the footnote instruction applies to records in two languages, it is presented in the vernacular and English in both versions.

Figure 1. Mixed Norwegian-English Translation in 370 Education (excerpt)
370  Utdanning og pedagogikk
370.1  Filosofi og teori, utdanning med bestemte målsettinger, pedagogisk psykologi
370.11  Utdanning med bestemte målsettinger
370.111  Fundamental education
370.112  Humanistic education
370.113  Yrkesutdanning (fagutdanning)
370.114  Moral, ethical, character education
370.115  Utdanning til samfunnsansvar
370.116  Utdanning for internasjonal forståele
370.1162  Exchange of students
370.1163  Exchange of teachers
370.117  Tverrkulturell (multikulturell) utdanning og tospråklig opplæring
370.1175  Bilingual education
370.118  Education for creativity
370.119  Education for effective use of leisure
Figure 2. Mixed Swedish-English Translation in 370 Education (excerpt)

370 Utbildning
370.1 Filosofi & teori, utbildning för bestämda mål, pedagogikens psykologi
370.11 Utbildning för bestämda mål
370.111 Grundläggande färdigheter
370.112 Fri uppostran
370.113 Yrkesutbildning
370.114 Moral, ethical, character education
370.115 Utbildning i samhällets grundläggande värderingar
370.116 Utbildning för internationell förståelse
370.1162 Internationellt studentutbyte
370.1163 Internationellt lärarutbyte
370.117 Interkulturell pedagogik och tvåspråkig utbildning
370.1175 Tvåspråkig utbildning
370.118 Education for creativity
370.119 Education for effective use of leisure

Figure 3. Mixed Norwegian-English Translation in 576 Genetics and evolution (excerpt)

576 Genetikk og evolusjon
576.5 Genetikk
576.52 Laws of genetics
576.53 Genetic makeup
576.54 Variation
576.542 Environmental factors (Mutagens)
576.544 Breeding patterns
576.549 Mutation
†Tilføy generell formindeling slik den er modifisert i noten under 576 (Add standard subdivisions as instructed under 576)

Figure 4. Mixed Swedish-English Translation in 576 Genetics and evolution (excerpt)

576 Genetik och evolution
576.5 Genetik
576.52 Laws of genetics
576.53 Genetic makeup
576.54 Variation
576.542 Environmental factors (Mutagens)
576.544 Breeding patterns
576.549 Mutation
†Lägg till underindelningar enligt instruktioner under 576 (Add standard subdivisions as instructed under 576)

Discussion

Zeng and Chan (2004) note the challenges in establishing interoperability among knowledge organization systems when the source and target systems have different structures and characteristics. A mixed translation of the DDC will share a common conceptual structure at the class level, but there will be differences at the terminological level.

As we proceed with the study, we have identified a number of open issues for investigation related to content and representation. One key concern is the scattering of topics from including notes in Norwegian to subordinate English-language classes. When a Norwegian class is revised from an abridged version to one parallel to the version in the English-language full edition, certain topics currently appearing in Norwegian in including notes will be moved to an English-language class deeper in the hierarchy. The Norwe-
gian terms will still appear in the index, but the topics will no longer appear in Norwegian in the subordinate class itself.

Since topics are distributed throughout the DDC by disciplinary focus, a topic may be chosen for full translation in one place and retained in English in another. In figure 5, the record for 370.113 includes references in Norwegian to topics that appear in English in the record for 331.2592 Training.

**Figure 5.** References in Norwegian and English

<table>
<thead>
<tr>
<th>Norwegian</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>370.113</td>
<td>Yrkesutdanning (fagutdanning)</td>
</tr>
<tr>
<td></td>
<td>Klassifiser fagopplæring i arbeidslivet, fagopplæring drevet av bedrifter i 331.259/2</td>
</tr>
<tr>
<td>331.259/2</td>
<td>Training</td>
</tr>
<tr>
<td></td>
<td>Class here interdisciplinary works on on-the-job vocational training, on vocational training provided by industry</td>
</tr>
</tbody>
</table>

Figure 5 also illustrates the use of a slash as a segmentation mark to show logical abridgment in notes and the number column. Smaller collections wishing to retain the abridged level of notation presented in DDK 5 can use the segmentation mark as a guide to logical abridgment of numbers. This information could also be used to create a wholly contained Norwegian version without the English-language records.

Some additional issues include handling of topics in scatter references, approaches to add tables and add instructions using data in two languages, and representation of relationships in the Relative Index in two languages. With respect to the last, our tentative plan is to provide two indexes—one in the vernacular, plus the complete English-language index. In an electronic environment, the two indexes can be browsed and searched simultaneously, but neither version will reflect the closely integrated structure between index terms and class records found in the indexes associated with the English-language full and abridged editions or with the localized translations of those editions. There will be instances of vernacular index terms pointing to concepts represented in records for which the language of description is English and vice versa. Perhaps this lack of symmetry at a terminological level is not troublesome as it might appear at first glance. In a discussion of multilingual thesauri, Hudon (1997) argues for acceptance of nonidentical and nonsymmetrical structures, and recommends that the number of descriptors in each linguistic version should be permitted to vary. The terminological content and structure of the Norwegian index will be at the very least equivalent to the version found in DDK 5 (and more extensive than the DDK 5 and the English-language versions in the areas with interoperable expansions). Additional Norwegian index terms could be added as needed to records in Norwegian or English.

**Pilot Study**

We are currently developing a full mixed Norwegian-English translation of an excerpt of the 370 Education schedule (complete with notes, add tables and instructions, and associated indexing) as the basis for a pilot usability study with Norwegian librarians in
second quarter 2008. Twenty Norwegian librarians were recruited in March 2008 to participate in the study. The pilot study group includes librarians from the national library and a library service agency, plus public, special, and university librarians. All are current users of the DDC. During a thirty-day period in second quarter 2008, the group will classify a pre-selected set of twenty documents in the field of education (split between works in Norwegian and works in English) using three tools: (1) the mixed translation schedule, (2) an excerpt from DDK 5, and (3) an excerpt from DDC 22 in English. All participants will complete an online questionnaire probing usability issues; follow-up semi-structured interviews will be held with study participants after analysis of the questionnaire responses.

We seek to learn more about the feasibility of a mixed translation as a classification tool by exploring such issues as:

- Should the level of notation in DDK 5 guide the level of classes in the vernacular in the mixed translation?
- Does the scattering of topics from including notes in abridged Norwegian classes to subordinate English-language classes affect the usability of the mixed translation?
- Should captions be presented in both languages at all levels of the translation?
- Should Norwegian index terms be used for some English-language classes in addition to English-language terms?
- Should other approaches be considered, e.g., a federated search of an abridged Norwegian database + the full English-language database?

If Norwegian librarians find the mixed-translation approach promising, the next step would be to proceed with a full Norwegian-English mixed translation. Whether to proceed with a Swedish translation of Dewey in any form is still under discussion in Sweden. The National Library of Sweden is considering a pilot study similar to the Norwegian one as a step in informing the decision.

**Conclusion**

We have undertaken a study of mixed translations of the DDC as an approach to streamlining the development and maintenance of a translation in countries / language groups where English enjoys wide use in academic and social discourse. The initial study is focused on the usability of the mixed translation as a classifier’s tool. We have not studied the implications of mixed translations for end-user facing applications beyond the notation itself. This needs to be considered in future work.

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**References**


