LEARNING TO CLASSIFY: ONLINE VERSUS PRINTED DEWEY

Philip Hider
School of Information Studies,
Charles Sturt University, Australia
email: phaider@csu.edu.au

ABSTRACT

Two versions of the Dewey Decimal Classification (DDC) scheme were offered as options to distance education students at Charles Sturt University (CSU) as the basis for their study and eventual application of it; the traditional printed version and the new online version called WebDewey. Students were provided with the same supporting materials. A study was carried out to examine whether the students' use of a particular version of DDC affected their learning. Despite the author's concerns about teaching elementary classification using the online version, no significant difference in performance between students who used WebDewey and students who used the printed volumes was found, although on the average the sample using the latter did perform a little better in the assessment. Neither were significant differences in aspects of DDC classification found. Nevertheless, the conclusions may not hold true for other online products, nor for other educational contexts, and educators must take care to consider each product's effectiveness as a teaching medium, irrespective of the current trend in favour of online materials. In any case, a revision of supporting materials when an online product replaces a printed one may well be worthwhile.

Keywords: Cataloguing and Classification; Organization of Information; Metadata; WebDewey; Dewey Decimal Classification (DDC)

INTRODUCTION

The Dewey Decimal Classification (DDC) has been available in CD-ROM for several years and at present is also available in Web-based versions. Whilst cataloguers used to the printed volumes may prefer to continue with the version they are familiar with, the Online Computer Library Center (OCLC - the publisher of the scheme) are promoting WebDewey fairly vigorously, integrating it into their new cataloguing software, called Connexion. Subscribers can log on to Connexion through Internet Explorer or Netscape browser (see http://www.oclc.org/connexion) and toggle, via tabs, between the interfaces for WebDewey, Cataloging, and Authorities, or they can specify a Dewey-only session.

WebDewey is supported by a guide and a tutorial, both linked to the interface. Within WebDewey itself, there is a context-sensitive help. All this assistance is aimed at the cataloguer who needs to know how to use this online version of DDC; it is *not* intended to assist the user in actually classifying. That is, the WebDewey learning aids assume the knowledge and skills required to classify, and in this way, they are aimed at existing cataloguers (or classifiers) who are making the transition to WebDewey, most likely from the printed volumes.

The question for educators in the field of bibliographic organisation, then, is whether an online version of a classification scheme can be used to teach novices the rudiments of classification as well as can a printed version. The author had previously taught elementary and more advanced courses on DDC using the printed volumes, and had previously classified using them in practice. While he had considered using the online version in the classroom earlier, particularly for novices with no familiarity with either medium, he had favoured the printed volumes on the basis of the following reasons:
   a) the printed volumes provide a spatial overview of the scheme that the two-dimension screen does not;
   b) navigation through the Schedules and Tables may be easier for some students less skilled at using hypertext;
   c) control of navigation necessary for successful number building may be more difficult for students not expert in managing windows.

However, the author was aware that his own predisposition towards the printed volumes may have biased this decision, and there are reasons why an online version might be a more effective medium for teaching, such as:
   a) some students may perceive an online version as more "up-to-date," more in line with the modern information environment, and thus be more interested in using it;
   b) the four printed volumes in the case of the full edition, may appear more daunting to the student, than the WebDewey interface (particularly to those students who are at ease in the Web environment);
   c) the hypertext in the online versions facilitates number building.

There are of course other potential advantages of WebDewey that are relevant to cataloguers, such as it allows more powerful searching, however these are not necessarily so important when teaching elementary classification. On the other hand, there are other practical considerations that make WebDewey attractive to the educator or trainer, in particular, the greater accessibility of the online version. Subscription to WebDewey for a class of students is likely to be substantially cheaper than the purchase of printed sets for each student. Indeed, it was the issue of accessibility which prompted the author to reconsider his preference for the printed version, as a medium for instruction. Teaching a course in bibliographic

organisation at Charles Sturt University (CSU) for the first time by distance, the author soon realised that a major problem for many students was actually gaining access to a copy of the printed version (even though editions 20, 21 and 22 were all deemed acceptable for the purposes of the course). This was not in fact a new problem, it was established that this was a recurring issue which showed little sign of abating. The problem was growing, with the increasing numbers of students taking the course. Even where a library held a copy, its use could be limited to within the library, thus significantly reducing students' time with it as most of the students have full-time jobs which coincide with library opening hours.

Given that our distance education students at CSU possessed at least a basic level of competency in the online environment, the author considered that it was reasonable to offer the students WebDewey as an equally legitimate alternative to the printed volumes, particularly if this would solve some of the students' accessibility problems. Fortunately access to WebDewey, for educational purposes, was granted by OCLC to our students, and this access was in place before the classification part of the course in question.

Thus students were given the choice of using either a printed set or WebDewey, along side the workbooks and other supporting materials, to learn how to classify using DDC and complete the corresponding assignment question. They were asked to state which version(s) of DDC they had used, and this gave the author an opportunity to investigate whether the medium of DDC might make a difference when it came to novice students' learning. While a few students indicated that they had used both online and printed versions, a significant proportion of students had solely relied on WebDewey, and a majority had solely used one set of the printed volumes. All students had otherwise been provided with exactly the same teaching materials and the same level of assistance on the part of the lecturer. The remaining of this paper examines whether the group of students who used the WebDewey (whether through choice or out of necessity) performed as well for the assignment question as did a randomly selected group of students (of the same size) who used a printed equivalent. The assignment question was designed to assess their performance at applying DDC.

METHODOLOGY

A few methodological points first need to be addressed. The printed equivalent was in fact a near-equivalent: apart from the differences of functionality, the students used DDC21 or DDC20, whereas WebDewey was based on the latest DDC22. However, the content differences would be minimal for novice students – the same structural features are present, of course – and the differences between DDC21 and DDC22 did not affect the solutions to the assignment question.

Solutions from students who had used a printed DDC21 (rather than DDC20) thus qualified for this study.

The assignment question consisted of ten topics (see Appendix) for which the students were asked to suggest the most appropriate DDC number, and to describe their workings (i.e. how they arrived at their numbers). The topics covered a broad range of disciplines and involved the various methods of synthesis (number building), within the Schedules or via the Tables; they were not tested on more advanced application, such as adherence to the "approximation of the whole" rule. Readers will note that such an assessment instrument emphasises practice over theory; while there are other assessment instruments on the course which stress the theory and the principles, the question of whether the balance is appropriate is left for another discussion. What is argued here, instead, is that this particular piece of assessment is valid in the context of learning objectives that include the application of a classification scheme, and reliable given that the students' answers were marked according to strict guidelines, taking the descriptions of their workings into account.

The next methodological issue is whether the students who opted for the online version differed in characteristics that were other than random. Many of these students were unable, or unwilling to attempt harder, to get hold of a printed copy – this may mean that they were slightly less likely to be working in cataloguing departments, or in libraries. However, almost all of the students were known by the author to be working in a library, and the performances of those who he knew were not, were excluded from the study, while none of the students worked in a cataloguing department, to the best of his knowledge. The fact that a student may be less able to find a printed DDC was thus not in itself considered a factor that would affect performance in the assessment; that a student may have been less inclined to look for one might conceivably mean less interest in the subject (at least initially), which might have affected performance, but on the other hand some students might have positively chosen to use WebDewey because it offered them more time with the scheme and/or because they were attracted to online interaction, which may have affected their performance for the better. The author, however, considers it unlikely that differences in attitude on the part of the two groups of students, at the outset, would have been large enough to make a significant impact on the aggregated results.

There was a reason – other than the author's own – why some students might prefer to use the printed volumes, assuming they could obtain them: the teaching materials had been written on the assumption of hard copy use. This might be particularly significant with regard to the workbooks -- although they do not all make references to page numbers, their exercises and routines are based on navigation through the printed volumes, which is not quite the same as navigating

through WebDewey, as has already been noted. A lack of customised support materials might therefore be a reason why students do not fare so well with WebDewey – if that is indeed the case.

The group who only used WebDewey (or at least did not own up to using a printed version) chose itself, since it was the smaller group, comprising ten students. A group of ten students was then selected on the basis of their surnames' alphabetical position, from those who had indicated that they had used a hard copy of DDC21. Students, who had given no indication of which version they had used, or had used both DDC21 and WebDewey, were excluded from selection. Students who had performed particularly poorly in the earlier assessment (i.e. they had failed it or had failed to submit it) were also excluded from both groups. Both groups' median and mean were calculated for an earlier assessment, involving descriptive cataloguing, so as to provide an indication of whether the two groups' ability in this subject area is on a par (Table 1). Of course, such an indication is just that – it in no way demonstrates an equality of ability between the groups when it comes to classification, or performance in this particular DDC assignment question. Nevertheless, the results do indicate an approximate parity (Student's t test on means give p value of 0.774; medians are equal), and given the "random" composition of both groups, to a large extent (as discussed above), the author considered the sample sizes large enough for a comparison to be of value.

Table 1: Marks for descriptive cataloguing assessment (out of 30 marks)

	Printed DDC users	WebDewey users
	15.5	15.5
	18	17.5
	20	19
	21	20
	22.5	20.5
	22.5	24.5
	23	27
	23	27
	28.5	28
	29	30
Mean	22.3	22.9
Median	22.5	22.5

For the purpose of this study, the students' solutions were re-marked according to a more refined calibration: a point was awarded for each segment of a class number deemed "correct." In some cases a base number could be "wrong," but additional numbers (for example from Table 1) could be awarded a point. In one

case, a point was awarded for not adding on, where a close reading of the note under the relevant Schedule number was required. Since some of the topics required more than one round of number building, the total number of points to be awarded was 26. No fractions were entertained – a segment was either accurate, or it was not. Of course, this marking scheme is not claimed as necessarily the "best" marking scheme for this assessment, let alone DDC classification generally, and some numbers may have been worth more or less marks than they had allocated to them (relative to the other numbers), according to their relative levels of difficulty, etc., but this marking scheme was considered sufficiently reliable and valid for the purposes of this comparative exercise – it was applied without any bias on the part of the marker (i.e. the author) to all twenty assignment questions, after they had been shuffled and their group affiliations covered.

As well as whether any significant difference in the overall performance could be detected, the author was also interested to see whether any differences within particular facets of the students' performances might be attributable to the DDC medium. Again, this investigation was prompted by the author's concern over particular disadvantages that use of WebDewey might entail i.e. (i) restricted view of the "big picture" (overview of the scheme) might affect base number selection, as might the inability to see the "middle picture," that is, the full arrays under the summaries where extensive scrolling may be required; (ii) lack of control over hyperlinked numbers and Tables might affect synthesis.

Each solution which was not awarded full points was analysed and the nature of its first error identified (the nature of secondary errors was ignored, since this was more difficult to identify and in some cases would be a consequence of a primary error). Six categories of error were defined, and they were made mutually exclusive by adopting the order of preference below:

      (a) incorrect base number
      (b) invalid number building in Schedules
      (c) invalid number building using Tables
      (d) incorrect number building (in either Schedules or Tables)
      (e) lack of number building in Schedules
      (f) lack of number building using Tables.

The two groups' distributions of primary errors made in each category were compared.

RESULTS

The overall scores for the twenty students are shown in Table 2 below (ordered lowest to highest within each group).

Table 2: Scores for DDC assignment question (out of 26)

	Printed DDC users	**WebDewey users**
	9	4
	11	5
	12	7
	12	8
	13	9
	13	11
	14	17
	19	17
	19	18
	20	19
Mean	14.2	11.5
Median	13	10

The distributions are not normal (they are more bimodal, in fact), and it is difficult to say whether the general population of students would produce a Gaussian distribution for this assignment question. The sample population distributions (as did the marks awarded in the actual assessment to the whole cohort) suggest that there is a tendency here for some students to spend little time with DDC and the corresponding teaching materials and do poorly, and also a tendency for other students to spend much greater amounts of time working through the exercises and getting to grips with DDC – and not so many students in between. In any case, both the Student's *t* test, which assumes a normal distribution, on the samples' means, and the Mann-Whitney test, which does not assume normality but does assume similar distributions (and the two sample distributions are in fact quite similar in shape), on the samples' medians, were performed in order to determine whether the samples provided any evidence that DDC medium had made for a significant difference in the students' learning of DDC application (as represented by their performance in this assignment question). The results of the tests are shown in Table 3 below.

Table 3: Tests on difference between average scores

	t value (*t* test)	*U* value (Mann-Whitney test)
	1.176	32.0
p value	0.255	0.171

The results do not show a statistically significant difference. However, the small sample sizes do not make the test very powerful, and the group with the better performance in the other assessment did perform worse on the DDC assignment question to an extent which suggests that further investigation may be in order.

On the question of facets of performance, the two groups' respective distributions of primary errors are shown in Table 4.

Table 4: Distribution of nature of errors

Nature of error	Printed DDC users	WebDewey users
Incorrect base number	35	47
Invalid number building in Schedules	8	4
Invalid number building using Tables	6	10
Incorrect number building	11	9
Lack of number building in Schedules	1	1
Lack of number building using Tables	10	7
	71	78

A chi-square test for significant distributional difference was performed (occurrences of invalid and lack of number building in the Schedules were combined so that all values are greater than five) and a *p* value of 0.636 resulted ($\chi^2=2.55$). (There is a slight statistical question regarding a small degree of dependence between the cases, but given the high *p* value, we will not pursue this matter here.) The evidence from this test and from direct observation of the numbers in Table 4, suggests that use of DDC medium does not impact on some facets of application more than on others, or at least it did not in the context of this assessment.

CONCLUSIONS AND DISCUSSION

It would appear from this brief analysis that the medium of DDC may have little impact on novice students' learning of how to apply the scheme, at least not in the distance education mode. On the other hand, this does not mean that there is no impact on more advanced learners, such as those who are already somewhat familiar with classifying using this scheme or another scheme, nor does it mean that WebDewey could not be supported with customised materials that would enhance students' learning.

Further, it may be that more research in this area is necessary before we can be confident that WebDewey is at least as good a teaching medium as is the printed version. Larger samples and different student cohorts may point to some difference, even if it is unlikely to be large. And whether WebDewey is as effective in the classroom situation remains an open question – it may be more

difficult for the teacher to conduct one-to-one instruction in front of the computer screen than with the four volumes of DDC laid out on the student's desk.

Further still, we should note there was an element of choice involved in this exercise – for those students who did have access, or potential access, to both. It may be that some students might perform better using WebDewey, others the printed volumes. Not all instructional situations will allow for the luxury of this choice, but where it is possible, it might be worth considering providing it. We must remember that distance education is not online education – a mix of modes and media is likely to yield optimal results. It is very possible that students using WebDewey may benefit from printing out screens from the Schedules or Tables, at times, as well as the internal guidelines such as the Introduction (found in volume 1 of the printed version and also available online).

We should also be careful not to extend these conclusions across other classification schemes with online versions. Many of the major schemes, such as LCC, UDC and NLM, are now available online. It may or may not be that WebDewey (which now covers both the full and abridged editions) is a clearer, more user-friendly interface compared with other online schemes. It may also be better supported, with a useful online tutorial, and extensive documentation produced by OCLC. Indeed, it should be noted that WebDewey is a much improved product. For example, it now incorporates a work space for users to keep track of their number building, and there are more hyperlinks between Tables and Schedules. Improved response times for screen redraws, that is, faster interaction between user and WebDewey, would also have helped make the product more attractive to student and cataloguer alike. This aspect very much depends on the particular product and on the particular connectivity situation between product and user. DDC software with WebDewey functionality might be preferable for some students.

One final observation from this study is worth mentioning: two of the students in the WebDewey group demonstrated a complete ignorance of the application of the Tables, which obviously is likely to have badly affected their scores. This may be a product of mere chance, of course, and no significantly more misuse or non-use of the Tables was detected in the analysis, but one can see how this might have occurred via WebDewey in a way it would be less likely to occur via hard copy, where one of the four volumes is devoted (for the most part) to the Tables. If the tutorial had been fully exploited by these two students, then it is unlikely that they would have remained in ignorance of their existence and function. While the tutorial was pointed out to the students (via the online forum), some students could do with being more firmly directed to these important support tools. It is worth remembering that however impressive an online product's content and functionality, and however attractive its interface, students need adequate support

if they are to fully exploit its benefits – if it is the content we are teaching, rather than testing students' computer skills.

The two students should, of course, have been aware of the existence and role of the Tables from using the workbooks and other materials provided in the course. Yet they were unable to translate this information into the WebDewey context – the author followed up with the students afterwards and this was their explanation, not that they had failed to look at the other materials. We must also remember, then, that what we sometimes take for granted in the physical environment may not necessarily be represented so concretely in the virtual one, despite software designers' best efforts to mirror them. Another way of reducing such serious gaps in the students' learning, therefore, would be to revise the teaching materials in the light of the introduction of WebDewey, so that screen shots, say, of how to use the online Tables supplemented the discussion and exercises on synthesis.

Despite the above cautions, however, of substituting printed products for online ones for teaching purposes, what this study shows is really how capable students are of adapting to the online environment, and how we should not be afraid of offering students online products, particularly in the distance education mode where they may be much more convenient with. While some problems with WebDewey may still be identified and some work on accommodating it specifically in the teaching materials is likely to be worthwhile, the study has reassured the author that WebDewey is perfectly usable as a medium for teaching elementary classification, and that its use does not appear to have had a particularly detrimental effect, in general, on learning. Most of the students using WebDewey appeared to be able to create a "mental model" of DDC that provided a sufficient overview of the scheme's structure and did not appear to experience serious problems adapting to a different form of navigation through the online Schedules and Tables.

Harvey (2003) observes that some of the practical problems of providing bibliographic organisation courses by distance education are now being overcome, and obtaining free access to WebDewey for the CSU students is an example he cites. One hopes that other schools of library and information studies, including those in Asia, are able to negotiate similar rights to WebDewey and other online tools of bibliographic organisation. These tools would not necessarily be any less relevant to, nor any less effective for, students in Asia, although one should bear in mind of course that some Asian libraries use standards not presently available online, that some Asian libraries are in less of a position to employ online tools such as WebDewey, and that some students in Asia do not have access to the technological infrastructure for which these products have been designed.

REFERENCE

Harvey, R 2003. Promoting quality metadata in libraries: The role of education. *Malaysian Journal of Library and Information Science.* Vol.8, no 2: 79-93

Appendix: Topics in the Assignment Question

1. Dictionary of industrial chemicals

2. Travel guide to Natal, South Africa

3. Cellular botany of seed-bearing plants

4. Epic Kurdish poetry

5. Unemployment in the performing arts

6. Vietnamese phrasebook for English speakers

7. Directory of Canadian accountants

8. Raising poultry for exhibition

9. Computer applications in records management

10. Nineteenth-century French romantic fiction