

The effect of signposts on access speed and lookup task success in long and short entries

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Abstract

One difficulty in using dictionaries is recognizing the relevant sense in polysemous entries. With a view to assisting dictionary users on this point, recent editions of some learners' dictionaries have introduced sense access facilitating devices into longer entries. The present study attempts to verify experimentally the effectiveness of one such device.

Key-words: dictionaries; dictionary access; sense discrimination; language learners

1. Introduction

One important finding of Tono's (1984) landmark study was that dictionary users are notoriously impatient with their dictionaries: they have a tendency not to look beyond the first sense within an entry unless there is a clear indication early in the entry that this particular sense is not really relevant. If there is no such indication, users all too often go for the early sense – even if it is not appropriate, but the inappropriateness is somewhat less than obvious. This can be seen as a failure on the part of the user's reference skills, in this case an ability to locate the relevant sense within the entry. But, from the user perspective, it can also be seen as a problem with the access structure of a dictionary. There are then two potential ways to go about fixing the problem: firstly, improve users' skills, perhaps through targeted training; secondly, improve on the access structure of dictionaries (cf. also Poluszyński 2006 for the Polish perspective). Focusing on the second point, an idea that directly follows from Tono's (1984) study is to try to include some very obvious and transparent indicators of what a given sense (= a subdivision of the entry) is essentially about. There are basically two approaches here: by gathering such indications in a kind of table of contents at the front of the entry (the *menu*), or by adding them at the front of each sense within the entry (*guidewords* or *signposts*). None of these devices appears to be particularly common in lexicography, but attention has been drawn to them by their adoption in the more recent editions of several English monolingual learners' dictionaries. However, empirical evidence of the effectiveness

of access-facilitating devices has been scarce. Perhaps the relatively low popularity of these devices is at least partly due to the lack of evidence of their effectiveness.

2. Access-facilitating devices in monolingual dictionaries

The first device designed to facilitate access to specific senses within the dictionary entry is the menu system. Tono (2001, p.167) defines the menu system as “a list of senses without examples and detailed information” and suggests that such a menu interface should be added at the beginning of any entry that is fairly long and complex. Tono’s expectation as to the usefulness of the menu system was grounded in the finding that if the first sense of the entry is followed by numerous examples, its complexity often prevents a dictionary user from examining further, often more relevant, senses.

The other access-facilitating device is the system of signposts as originally applied in the third edition of the *Longman Dictionary of Contemporary English* (LDOCE3, Summers 1995, see Appendix A for an example), defined as “words or short phrases that distinguish the meanings of longer entries, act as a visual index to help the user access the meaning they want as quickly as possible” (LDOCE3, p.xi), and the system of guidewords used in the *Cambridge International Dictionary of English* (CIDE, Procter 1995). These two meaning access facilitators are basically similar in their idea of helping the user find the appropriate meaning within the longer entry and serving a single sense each. However, there are some differences. Tono (2001, p.174) points out that in LDOCE3 senses are grouped in entries by part of speech. Accordingly, if a word is classified into two parts of speech, it will have two separate entries for each of them (e.g. cook (n.) and cook (v.)). Beyond that, entries in LDOCE3 are polysemous, i.e. a single entry contains all senses of a word for a given part of speech. CIDE, in contrast, prefers semantic entry organization, where every sense of a given word is explained in a separate monosemous entry. However, such an entry includes as nested subentries any derivatives of the headword of other syntactic categories with the same basic meaning, for example the noun headword **globe** WORLD includes the derivatives **global**, **globally**, **globalist**, **globalize** and **globalization**. As a consequence, guidewords in CIDE are always placed at the top of the entry (Tono 2001, p.174).

3. Previous studies of the effect of meaning access indices

Tono (1992; 2001: Chapter 10) examined the role of the menu system placed at the beginning of the entry. Working with Japanese learners of English at two levels of dictionary

reference skills (first-year university students and third-year junior high school students, respectively), Tono set out to find out whether the menu is helpful in locating specific information embedded within dictionary entries.

Tono found a significant effect of menus in the lower-level group only, where the menu-supported subgroup performed on average 28% better than the non-menu subgroup (42% versus 33% success rate). No significant difference, however, was noted between the menu and non-menu groups of university students. Tono's conclusion was that the menu system facilitated access to the information required and supported the look-up process, but only as long as the users' reference skills are poor.

In another study, Tono (2001, Chapter 11) looked, in turn, at the effect of signposts (LDOCE3) and guidewords (CIDE) on the speed of access to examples embedded under specific senses. The results of this investigation are confounded by the fact that the microstructural organization in the two learners' dictionaries is principally different, and LDOCE3 with its polysemous entries was in general found to be more efficient in terms of access time. With regard to the presence of meaning access devices, signposts tend to work better in entries of normal length. In contrast, in very long entries the opposite seems to be the case. However, as rightly pointed out by Tono (2001, p. 183), this last effect could be a peculiarity following from the LDOCE practice of mixing senses and multi-word-units ("collocations", in Tono's terminology) and listing them at the same level.

Interesting and relevant implications also follow from a study by Bogaards (1998), who examined the way in which 54 pre-university Dutch students of English were asked to search long entries in four learners' dictionaries. Shorter access times were found in those dictionaries whose access structures were based on semantics as opposed to grammar. The two fastest dictionaries turned out to be LDOCE3 and CIDE, which might suggest a positive role in this regard of meaning access facilitators present in the two dictionaries. Bogaards (1998, p. 561) concludes that clear access guidance to a proper sense of the word is a highly advantageous feature of a dictionary.

4. The study

4.1. General

As discussed in the previous section, three studies by two researchers have been undertaken so far to examine the microstructure of the dictionary entry from the point of view

of the effectiveness of meaning access indices for sublemmatic addressing, and the findings in general point to the LDOCE signpost system as holding the greatest promise.

The present study attempts to verify experimentally the usefulness of such indices on the basis of signposts as used in the most recent fourth edition of the *Longman Dictionary of Contemporary English* (LDOCE4, Summers 2003). Since previous studies suggest that entry length might be an important consideration, we planned to investigate the effect of entry length as well, to see whether signposts work equally well in both short and long entries or whether there is a difference depending on the length of the entry. Finally, we also included users' educational level as a factor in view of Tono's (2001) findings, assuming as he did that educational level correlates well with dictionary reference skills.

With regard to the outcomes measured, we combined measures of access speed with two measures of task success, as we also wanted to see whether the presence of signposts within a dictionary entry improved the translation accuracy and sense selection accuracy under the headword given.

4.2. Hypotheses and variables

We set out to test the following four hypotheses:

1. Signposts shorten the duration of the look-up procedure.
2. Dictionary users achieve better translation accuracy and sense selection accuracy if they are provided with signposts.
3. The advantage of signposts is greater in long entries than in short entries.
4. Students at a lower educational level benefit from signposts to a greater extent than those at a higher educational level.

Hypothesis 1 concerns the duration of the look-up process and predicts that entries with signposts allow the users to find and extract the definition faster than entries without such help. Hypothesis 2 predicts that signposts help dictionary users find the most suitable sense and definition of an item, and, as a consequence, render a more accurate translation. Hypothesis 3 is grounded in the expectation that signposts are generally of little importance in short entries as such entries can be more easily scanned by dictionary users and, as a consequence, the appropriate sublemma should be relatively easy to find without additional help. Long entries, in contrast, are more elaborate, they have a larger number of senses, and are thus more demanding in terms of selecting the proper sense of the word. Hypothesis 4 predicts, in line with the findings of previous research, that signposts provide greater benefit

to those subjects whose educational level is low, and who, accordingly, have poorer reference skills than more advanced students.

The variables used in the present study are shown in Table 1 below, grouped by hypotheses for ease of reference.

Table 1: Variables and hypotheses

| Hypotheses | Independent variables | Dependent variables |
|--------------|--|---|
| Hypothesis 1 | Between subjects: | Duration of the look-up Translation accuracy Sense selection accuracy |
| Hypothesis 2 | Presence or absence of signposts | |
| Hypothesis 3 | Within subjects: Length of dictionary entries | |
| Hypothesis 4 | Between subjects: Dictionary users' educational level | |

With respect to the presence or absence of signposts in Hypotheses 1 and 2, we contrasted two microstructures, one supported by a meaning access index in the form of signposts as used in LDOCE4, and the other one with signposts removed, but identical in every other respect. For Hypothesis 3, the length of dictionary entries was varied to see whether signposts work equally well in short and long entries or whether the length of the entry would make a difference. For Hypothesis 4, the independent variable was users' educational level to see if students at a lower educational level would benefit more from signposts.

The whole procedure was timed so as to estimate whether there is any difference in the time taken to complete the tasks with and without signposts, respectively. We also wanted to see whether the presence of signposts within a dictionary entry improved the translation accuracy and sense selection accuracy under the headword given. Thus, the three dependent variables used were the time taken to find the appropriate information in the dictionary entry, translation accuracy and sense selection accuracy.

4.3. Subjects

The subjects participating in the present study were 51 secondary school students (*Liceum Ogólnokształcące* in Polish), both male and female, between 16 and 19 years of age. All subjects had Polish as their native language. They attended five different groups at two levels: 20 were first-grade students, 31 were in third grade, which is the last year prior to university education. The first-graders had been taught English for three or four years and their level of proficiency in English can be described as pre-intermediate. The third-grade students were at the intermediate level of proficiency and had received six to seven years of

English instruction. The teachers confirmed that none of the five groups taking part in the experiment had been given any specific training on dictionary use. Also, only an insignificant number of subjects had used monolingual dictionaries before. All of them, however, were familiar with a variety of bilingual and bilingualized dictionaries, having used them during English classes and for homework.

4.4. Instrument and procedure

To assess the role of signposts as meaning access indices, a 10-item test was prepared. Each item on the test (see Appendix B for an example item) took a single page and consisted of a fairly simple English sentence with an underlined word or expression and an incomplete Polish translation, where the missing target word was to be translated with the help of a dictionary entry that was placed underneath both English and Polish sentences. There was also a space below the dictionary entry where subjects were asked to note down the time it took them to complete the task. Each set of the test consisted of ten pages which had been stapled together and handed in to the subjects at the beginning of the procedure.

The criteria for selecting the materials for the experiment were established on the basis of the following assumptions. Firstly, as the primary task the students were asked to complete was to find and indicate the information in the dictionary entry which they had used for translating the target words, 10 English words used in the experiment were chosen out of the vocabulary used fairly frequently. Such an arrangement was aimed at focusing the subjects' attention not so much on translation as on the information contained in the dictionary entry. Secondly, so as to make the students scan the whole dictionary entries, for each of those words less well-known senses were selected (as in Bogaards 1998). Thirdly, in order to estimate the difference between the effectiveness of signposts in short and long entries, 5 items with short entries (up to 4 senses) and 5 items with long entries (up to 10 senses) were used, so as to get the data on how each subject performed with short and long entries. The long and short entries were alternated within each set to minimize any effect of order, due to factors such as fatigue or discouragement. Two different versions of the sets were employed in the study: one with signposts (25 subjects) and one without signposts (22 subjects).

The subjects were asked to read the English sentence with the underlined word or expression and its Polish translation with a gap for the target word. Then they had to look up the target word in the dictionary entry placed below the sentence on the same page. After they had found the relevant information they were expected to underline it in the dictionary entry, translate the English word into Polish using the appropriate part of the definition and signal

task completion to the research supervisor by raising their hand, and the exact time was noted down. Subjects were not allowed to move on to the next page before the previous section of the task was completed by the whole group. The whole routine was explained in detail with the use of an example page at the beginning of the procedure.

Before the actual application, the test and the entire procedure were piloted on a small group of five students at a level intermediate between the two experimental groups (grade 2), and no problems were identified with the instrument or the procedure.

5. Results and discussion

As indicated in section 4.2, we set out to test four hypotheses focused on the effect of signposts on the look-up process and its outcome.

In order to assess the influence of our design variables on dependent variables, three GLM 3-way repeated measures analyses of variance were computed, one such ANOVA for each dependent variable (see Table 1 for a listing of the dependent and independent variables). The hypotheses will be discussed in turn below, followed by other findings.

5.1. Effect of the presence of signposts on search time (Hypothesis 1)

Table 2 gives the mean search times for the groups with and without signposts, respectively.

Table 2: The effect of signposts on search time

| Entry type | Mean search time (sec) | Std. Err. | N |
|---------------|------------------------|-----------|----|
| Non-signposts | 53.2 | 3.0 | 25 |
| Signposts | 46.5 | 3.0 | 26 |

As can be seen from Table 3, the group that were provided with signposts searched for the information on average 14.4% quicker than the group with no signposts in their entries. However, the effect of signposts on search time is not statistically significant at the 5% level (3-way ANOVA, $F_{(1,47)}=2.49$, $p=0.12$, n.s.). Thus, Hypothesis 1 cannot be confirmed from the present sample, even though there is a non-trivial difference between the means. It is possible that, given the observed tendency, a slightly larger sample would reach significance.

5.2. Effect of the presence of signposts on translation accuracy and sense selection accuracy (Hypothesis 2)

Hypothesis 2 predicts that dictionary users achieve better translation and sense selection accuracy when they are provided with signposts. The results obtained from the present study reveal that the presence of signposts does not have a significant effect on translation accuracy, and the accuracy rates are nearly identical (3-way ANOVA, $F_{(1,47)}=0.41$, $p=0.84$, n.s.). A more noticeable difference (12.5%) was found for sense selection accuracy (79.9% with signposts, 71% without signposts), but it did not reach significance (3-way ANOVA, $F_{(1,47)}=2.65$, $p=0.11$, n.s.). Again, just as for search time, the tendency looks promising and it is possible that with a slightly more substantial sample the difference would have reached a level of 5%. Table 3 shows the relevant rates for the effect of the presence of signposts on translation accuracy and on sense selection accuracy.

Table 3: The effect of the presence of signposts on translation accuracy and sense selection accuracy

| Entry type | Translation accuracy | Std. Err. | Sense selection accuracy | Std. Err. | N |
|---------------|----------------------|-----------|--------------------------|-----------|----|
| Non-signposts | 70.1% | 3.3% | 71.0% | 3.8% | 25 |
| Signposts | 71.0% | 3.3% | 79.9% | 3.9% | 26 |

5.3. Length of entries (Hypothesis 3)

Hypothesis 3 was put forward to test whether the advantage of signposts in long entries was greater than in short entries, as measured by the three dependent variables investigated, i.e. whether signposts shortened the time spent on the look-up procedure, and/or improved translation and sense selection accuracy, more significantly in long entries than in short ones.

To begin with, it is worth checking whether the length of entries alone had any effect on the dependent variables. The commonsensical expectation would be that longer entries would take longer to search, and the increased length would make it more difficult to achieve high accuracy. This expectation is largely borne out by the data: the searches took 60% longer on average in the long entries compared with the short entries (3-way ANOVA, $F_{(1, 47)}=62.2$, $p<0.01$); translation accuracy was better by 22% in short entries (3-way ANOVA, $F_{(1, 47)}=16.4$, $p<0.01$). Entry length did not however significantly affect sense selection accuracy, with only a 2% difference between the means for long and short entries, respectively (3-way ANOVA, $F_{(1, 47)}=0.23$, $p=0.63$, n.s.).

Table 4: The effect of entry length on search time, translation accuracy and sense selection accuracy

| Entry length | Mean search time (sec) | Std. Err. | Translation accuracy | Std. Err. | Sense selection accuracy | Std. Err. | N |
|--------------|------------------------|-----------|----------------------|-----------|--------------------------|-----------|----|
| Short | 38.3 | 1.84 | 77.6% | 2.9% | 76.2% | 3.1% | 51 |
| Long | 61.5 | 3.14 | 63.5% | 3.0% | 74.7% | 3.2% | 51 |

Moving on to Hypothesis 3 proper, we have to examine the interaction of entry length and the presence of signposts for the three dependent variables, and the relevant results are presented in Table 5.

Table 5: The interaction effect of entry length and presence of signposts on search time, translation accuracy and sense selection accuracy

| Entry type | Length | Mean search time (sec) | Std. Err. | Translation accuracy | Std. Err. | Sense selection accuracy | Std. Err. | N |
|---------------|--------|------------------------|-----------|----------------------|-----------|--------------------------|-----------|----|
| Signposts | Short | 35.5 | 2.6 | 75.7% | 4.1% | 81.0% | 4.5% | 26 |
| Non-signposts | Short | 41.1 | 2.6 | 79.6% | 4.0% | 71.5% | 4.4% | 25 |
| Signposts | Long | 57.5 | 4.5 | 66.4% | 4.2% | 78.8% | 4.6% | 26 |
| Non-signposts | Long | 65.4 | 4.4 | 60.6% | 4.1% | 70.5% | 4.5% | 25 |

For search time, there was no observable interaction effect (3-way ANOVA, $F_{(1, 47)}=0.15$, $p=0.70$, n.s.), nor was there any for sense selection accuracy (3-way ANOVA, $F_{(1, 47)}=0.03$, $p=0.86$, n.s.). For translation accuracy, the interaction effect was not significant either (3-way ANOVA, $F_{(1, 47)}=1.95$, $p=0.17$), but an intriguing tendency can be noted (see Figure 1): in long entries, mean translation accuracy was about 10% higher for signpost-equipped entries, but in short entries it was actually the non-signposts entries that achieved a slightly (5%) higher mean accuracy. It would, though, be premature to conclude that the presence of signposts in short entries is in any way counterproductive based on this statistically nonsignificant tendency (but see section 5.5 below for further observations). Overall, we found no difference as to how helpful signposts are in shortening the search time in short and long entries, or in assisting sense selection. Consequently, Hypothesis 3 was not confirmed as the effect of signposts is similar in short and long entries.

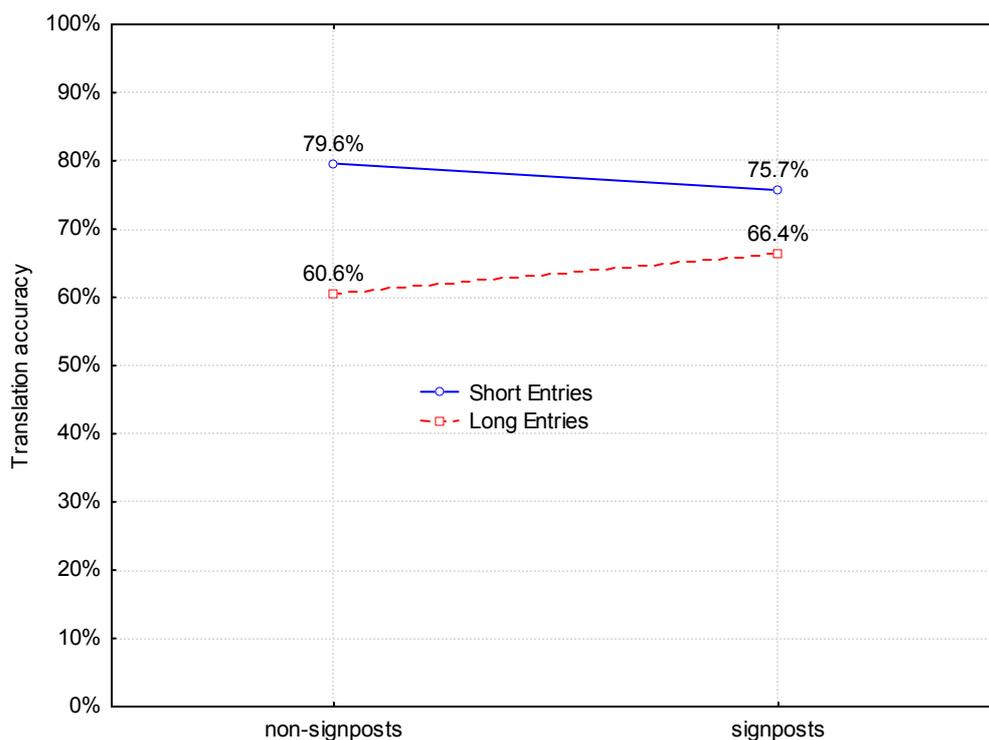


Figure 1: The interaction effect of entry length and presence of signposts on translation accuracy

5.4. Educational level (Hypothesis 4)

Hypothesis 4 was formulated on the assumption that signposts facilitate the dictionary look-up process to a greater extent in the case of students at a lower educational level, whereas students whose educational level is higher do not need signposts to find the required information in a comparable amount of time.

Just as for Hypothesis 3 above, we will first examine if an overall difference can be noted between subjects at the two educational levels for the measured dependent variables, quite apart from any effect of signposts. Mean group measures are given in Table 6. The results for search time show that it took the lower-grade subjects well over twice as much time to search for the target data than was needed by higher level students (3-way ANOVA, $F_{(1, 47)}=78.80$, $p<0.01$). The difference in translation accuracy between the two grades was only about 9% and it was not statistically significant (3-way ANOVA, $F_{(1, 47)}=1.54$, $p=0.22$, n.s.). For sense selection accuracy, the difference was 7%, and again it was not significant (3-way ANOVA, $F_{(1, 47)}=0.89$, $p=0.35$, n.s.).

Table 6: The effect of educational level on search time, translation accuracy and sense selection accuracy

| Grade | Mean search time (sec) | Std. Err. | Translation accuracy | Std. Err. | Sense selection accuracy | Std. Err. | N |
|-------|------------------------|-----------|----------------------|-----------|--------------------------|-----------|----|
| 1 | 68.7 | 3.3 | 67.7% | 3.6% | 78.0% | 4.3% | 20 |
| 3 | 31.1 | 2.7 | 73.5% | 2.9% | 72.9% | 3.4% | 31 |

Thus, it was only in search time that there was a marked difference between students at the two levels.

Focusing now on the prediction of Hypothesis 4, the mean values for the 4 combinations of educational level (represented by school grade) and the presence of signposts are listed in Table 7. The figures indicate that the interaction of grade and the presence of signposts was not statistically significant with respect to search time (3-way ANOVA, $F_{(1, 47)}=0.89$, $p=0.35$, n.s.). This means that signposts did not improve the lookup speed for lower-level students any more that they did for higher-grade users: both levels benefited equally from the presence of signposts. Hypothesis 4, accordingly, was not confirmed with respect to search time. Largely the same is true for sense selection accuracy (3-way ANOVA, $F_{(1, 47)}=0.10$, $p=0.75$, n.s.).

Table 7: The interaction of grade and presence of signposts on search time, translation accuracy and sense selection accuracy

| Grade | Presence of signposts | Search time | Std. Err. | Translation accuracy | Std. Err. | Sense selection accuracy | Std. Err. | N |
|-------|-----------------------|-------------|-----------|----------------------|-----------|--------------------------|-----------|----|
| 1 | non-signposts | 71.8 | 4.4 | 70.9% | 4.9% | 72.7% | 5.7% | 11 |
| 1 | signposts | 65.6 | 4.9 | 64.4% | 5.4% | 83.3% | 6.3% | 9 |
| 3 | non-signposts | 34.6 | 3.9 | 69.3% | 4.3% | 69.3% | 5.1% | 14 |
| 3 | signposts | 27.5 | 3.6 | 77.6% | 3.9% | 76.5% | 4.6% | 17 |

The picture for the translation accuracy variable is rather more interesting, and the relevant graph of interaction is shown in Figure 2. Even though this interaction effect is still not significant at the 5% level (3-way ANOVA, $F_{(1, 47)}= 2.52$, $p=0.11$, n.s.), it does approach the 10% level and there is an intriguing tendency: while in the higher-grade group, signpost-supported entries yield higher mean translation accuracy, in the lower-grade group, it is the bare (non-signpost) entries that result in a higher mean accuracy, the differences between means being of the order of 10% in each case. We must stress that this tendency runs counter to the prediction made in Hypothesis 4. It is possible that for translation maximally simple entries may hold some advantage (cf. also Lew 2004: 185).

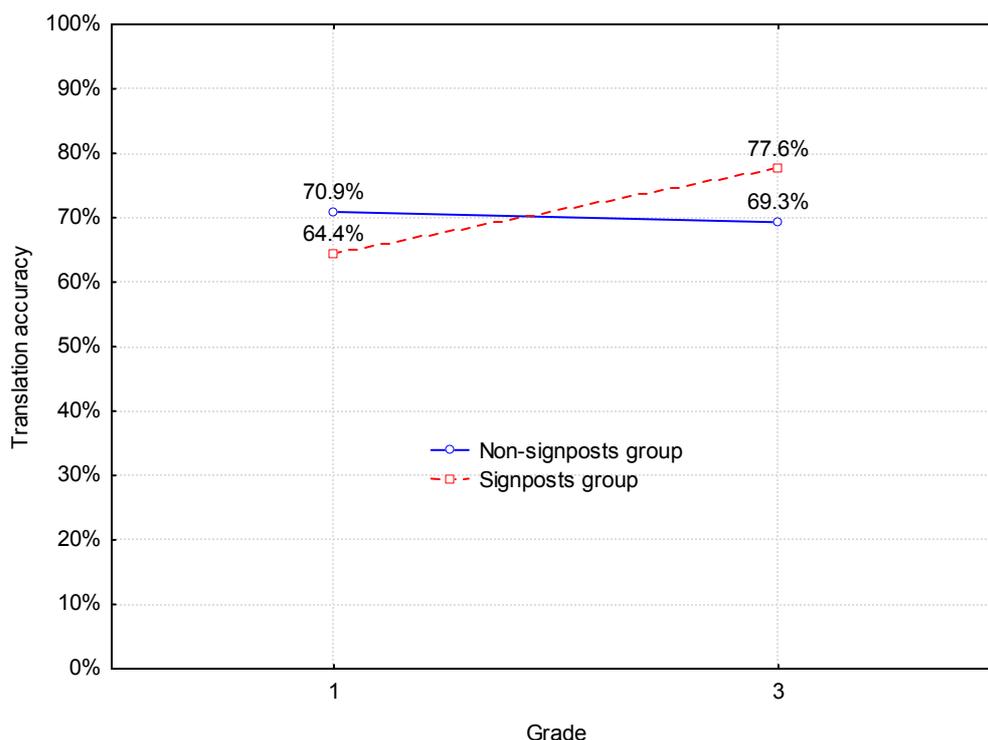


Figure 2: The interaction of grade and signposts on search time

5.5. Additional findings

Since we have used a full-factorial design in our study, some tendencies have also come to light which were not predicted in the original hypotheses. For lack of space, we will only briefly illustrate three of these that appear to be the most interesting.

The first somewhat surprising finding is that in terms of sense selection accuracy, the lower-grade students outperformed the higher grade students by about 7%, having achieved an accuracy of 78% as opposed to 72.9% for the more senior students. Although the difference is not significant (3-way ANOVA, $F_{(1, 47)}=0.89$, $p=0.35$, n.s.), one would reasonably expect a reverse tendency. One possible way to explain this tendency is that the lower-grade students were working through the entries not only more slowly (see the following paragraph), but also more carefully than their older counterparts.

Secondly, it is noteworthy that lower-grade students spent much more time performing the tasks involving long entries. The difference in search time between short and long entries was not as dramatic for higher grade students (see Figure 3, the group search time means are indicated in the graph). This interaction effect was highly significant (3-way ANOVA, $F_{(1, 47)}=7.68$, $p<0.01$).

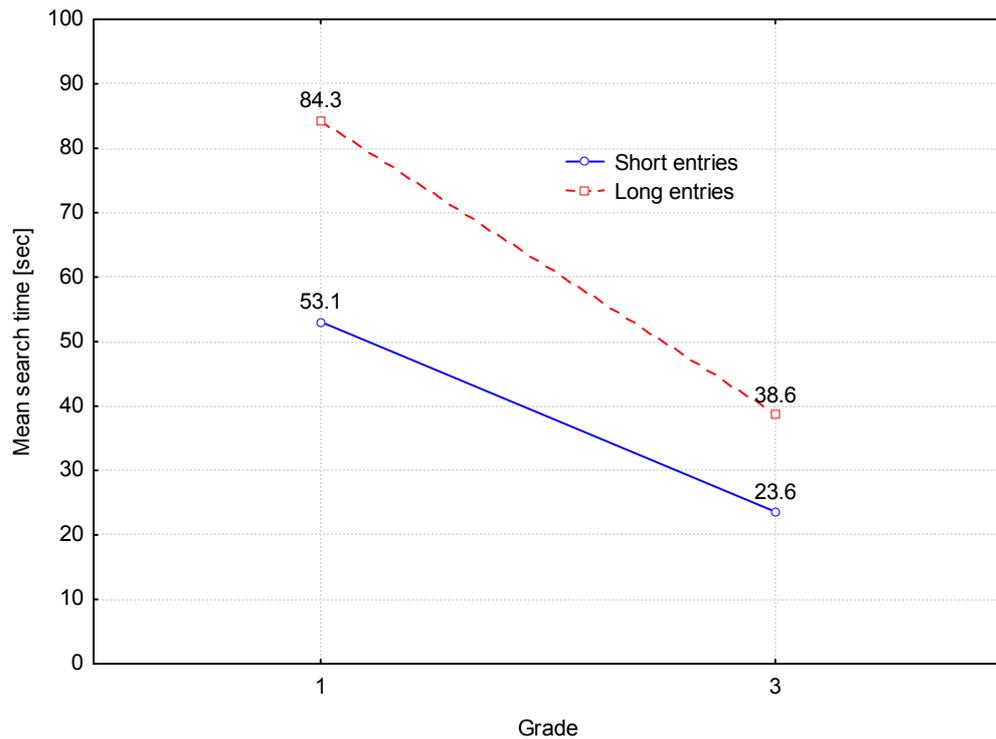


Figure 3: The interaction of entry length and grade

The third interesting finding concerns the complex 3-way interaction effect of entry length, students' educational level and presence of signposts on sense selection accuracy: here the results indicate that the subjects at lower grade seemed to have taken advantage of signposts in short entries, whereas higher grade students benefited from signposts in long entries. The effect is statistically significant (3-way ANOVA, $F_{(1, 47)}=6.37$, $p=0.015$). Figure 4 represents graphically these somewhat complex relationships, with exact sense selection accuracy means given in the graph.

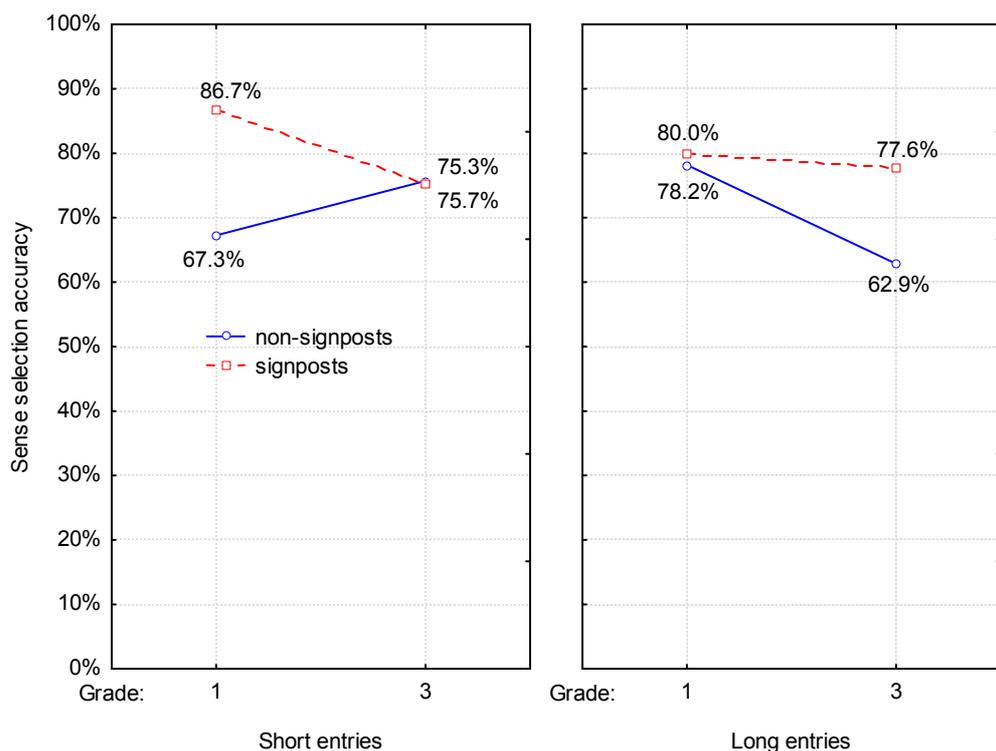


Figure 4: The interaction effect of entry length, educational level and presence of signposts on sense selection accuracy

6. Conclusion

Taking all the above findings together, we can draw several conclusions from the present study. The aim of a meaning access index, such as a system of signposts utilized in LDOCE4 and examined in the present study, is to support the dictionary look-up process by helping to guide the users to the required sense quickly and accurately. The results of the present study indicate that signposts serve their design purpose to a certain limited extent. The time taken by students to locate the appropriate information in the dictionary entry was on average 14.4% shorter with signposts than without them, an interesting difference which, however, is not statistically significant, though it does not come very far from reaching such significance. To confirm the supportive role of signposts, one would need to conduct further research with a larger sample. We can say, though, that the difference between the means is promising, and there is an overall positive tendency towards meaning access indices as efficient look-up facilitators.

Further, we found no support for the claim that signposts tend to help lower-level students to a greater degree than they do higher-level students; that is, if the signposts come to

the dictionary users' assistance, they are of similar value to students at the educational levels investigated here.

Next, signposts were found to perform, on average, similarly in both long and short entries. This finding argues against the hypothesis that long entries benefit from signposts more. However, one effect that had not been predicted but turned out to be significant is that lower-level subjects are helped by signposts in short entries, whereas higher-level students benefited from signposts in long entries. One practical lexicographic recommendation of this finding might be to include signposts even in entries of modest length in dictionaries aimed at pre-intermediate students.

The results also contradict the hypothesis that signposts have any considerable impact on translation accuracy, as measured by the translation success score. In the present study, however, the higher-grade students achieved a somewhat higher translation accuracy in the presence of signposts than without them, as opposed to lower-grade subjects, and this difference is not very far from statistical significance.

With regard to sense selection accuracy, the study did not find a significant effect of the presence of signposts, although there was a tendency to select senses more accurately in the presence of signposts, which again might have reached significance with a somewhat larger sample. Surprisingly, lower grade students achieved a higher mean score on the sense selection accuracy than higher grade students. One possible reason for this result might be the fact that the subjects at lower educational level might have read the dictionary entry much more carefully in their search for the needed information. Higher grade students, in contrast, might have scanned the entries more casually and, consequently, sometimes picked the wrong sense. It is noteworthy, however, that higher grade subjects achieved better translation accuracy, which, in conjunction with the sense selection accuracy finding might suggest that in some cases they simply guessed the meaning of the word and did not bother to look over the whole dictionary entry.

In conclusion, our study indicates that signposts serving the purpose of a meaning access index are not quite as helpful as some lexicographers might hope. Although the figures for search time were on average 14.4% better for the group that referred to entries with signposts, the effect proved to be statistically non-significant. In order to verify the positive role of signposts as meaning access facilitators, further studies need to be carried out.

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Appendix A: Example LDOCE3 entry with signposts

S 1 **col·lege** /'kɒlɪdʒ||'kɑ:-/n

W 2

1 ► ADVANCED EDUCATION ◀ [C,U] **a)** *especially BrE* a school for advanced education, especially in a particular subject or skill: *a teacher training college* —see also **SIXTH FORM COLLEGE** **b)** *AmE* a school for advanced education where you can get a **BACHELOR'S DEGREE**: *Which colleges have you applied to?* | **college campus/class/graduate etc** *Many firms will only hire college graduates.* | **go to college** (=attend a college or university) —see also **JUNIOR COLLEGE** —compare **UNIVERSITY**

2 ► PART OF UNIVERSITY ◀ [C] one of the groups of teachers and students that form a separate part of some universities, especially in Britain: *Trinity College, Cambridge*

3 ► BUILDINGS ◀ [C] the buildings used by any of these organizations

4 ► STUDENTS AND TEACHERS ◀ [C also + plural verb *BrE*] the students and teachers of one of these organizations: *The whole college turned up to the memorial service.*

5 ► ORGANIZATION ◀ [C] a group of people who have special rights and duties within a profession or organization: *the Royal College of Nursing* —see also **ELECTORAL COLLEGE**

6 ► SCHOOL ◀ [C] *BrE* a word used in the name of some large schools, especially **PUBLIC SCHOOLS**

Appendix B: Example test item (signposts, long entry)

Przetłumacz podkreślone wyrażenie na język polski korzystając z załączonego hasła słownikowego:

Have you been working in the garden? You are as black as pitch!

Pracowałeś w ogrodzie? Jesteś czarny jak _____ !

pitch n

1 SPORTS FIELD [C] *BrE* a marked out area of ground on which a sport is played; =**field**: **football/cricket/ rugby etc pitch** *the world-famous Wembley football pitch | He ran the length of the pitch and scored.* | **on the pitch** (=playing a sport) *Jack was on the pitch for his school in the Senior Cup Final.*

2 STRONG FEELINGS/ACTIVITY [singular, U] a strong level of feeling about something or a high level of an activity or a quality: *The controversy **reached** such a **pitch** (=become so strong) that the paper devoted a whole page to it.* | **a pitch of excitement/excellence/perfection etc** (=a high level of excitement etc) *He screamed at her in a pitch of fury.* | *The goal roused the crowd to **fever pitch** (=a very excited level).*

3 MUSIC a) [singular, U] how high or low a note or other sound is: *Ultrasonic waves are at a higher pitch than the human ear can hear.* **b)** [U] the ability of a musician to play or sing a note at exactly the correct level: *She's got **perfect pitch**.*

4 PERSUADING [C] *informal* the things someone says to persuade people to buy something, do something, or accept an idea: *an aggressive salesman with a fast-talking sales pitch* | **make a/sb's pitch (for sth)**(=try to persuade people to do something) *He made his strongest pitch yet for standardized testing in schools.*

5 BASEBALL [C] a throw of the ball, or a way in which it can be thrown: *His first pitch was high and wide.*

6 BLACK SUBSTANCE [U] a black, sticky substance that is used on roofs, the bottoms of ships etc to stop water coming through: *The night was **as black as pitch** (=very dark).* → PITCH-BLACK, PITCH-DARK

7 SHIP/AIRCRAFT [U] an up and down movement of a ship or an aircraft; → **roll**: *the **pitch and roll** of the ship*

8 SLOPE [singular, U] the degree to which a roof slopes or the sloping part of a roof: *the steep pitch of the roof*

9 STREET/MARKET [C] *BrE* a place in a public area where someone who sells things to people goes to sell things or where an entertainer goes to sell things or perform: *We found the boy at his usual pitch at the bottom of the Acropolis.* → **queer sb's pitch/queer the pitch for sb** at QUEER³

English translation of the Polish instructions:

Translate the underlined portion into Polish with the help of the attached dictionary entry.