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〔原　著〕

ブラウザーで動く語彙エクササイズの作成が簡単に出来るCALL（Computer-Assisted Language Learning）システム

A CALL (Computer-Assisted Language Learning) system enabling easy construction of browser-based vocabulary exercises

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Abstract:

A system to enable the easy construction of vocabulary learning and practice exercises for browser deployment was developed. The core of the system is an Adobe Flash movie whose design and content depend on two external xml files which are edited by the educator to produce different exercises. The exercises are of the matching type, using drag and drop to line up vocabulary items in one language with the corresponding items in another language. However, there is the additional feature that every correctly placed item will be removed from its matched position if a subsequent item is incorrectly placed, unless the item has been placed correctly a set number of times (typically, 2 or 3) consecutively. This stimulates memorization of a correctly placed item which was previously unknown. The first match may be accomplished by trial and error, but the learner is stimulated to memorize the item so that it may be placed correctly the next time, after an incorrect match has triggered its removal.

The operation of the system is described and its potential usefulness, particularly to English for Specific Purposes (ESP) learners, is asserted.

Keywords： CALL, Flash, vocabulary acquisition

1. Introduction

It goes without saying that an essential part of learning a language is learning the vocabulary of that language. Of course, without also knowing the grammar and syntax we cannot communicate very effectively in the language, but without knowing the words we cannot communicate at all. Leaving aside the contentious question of the relative importance of vocabulary and grammar/syntax in learning a new language, let us briefly consider the equally contentious question of how best to learn vocabulary. In recent years, with the decline of the traditional grammar-translation method of language learning in favor of the communicative approach, explicit learning of vocabulary has been discouraged. As Godwin-Jones[1] puts it: "...the intentional study of sets of vocabulary. This is an area of SLA (second language acquisition) that has been out of fashion, as the sense of rote learning it evokes is out of step with the model of communicative language learning, fostering as it does the idea of language as something mechanical and fixed" (p4). The second language acquisition model of Krashen,[2] with its clear distinction between unconscious "acquisition" and conscious "learning", and strong preference for the former, has been hugely influential in the area of language learning and teaching since the early 1980s. In this model, acquisition of new vocabulary items from encountering them in context so that they may be understood directly without formal study (as

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young children do) is considered much more effective than direct learning of words through the learner's native language. This idea became the mainstream in research and teacher training, and ESL (English as a Second Language) teachers were advised by many "experts" to confine formal vocabulary study to a very minor role in their lessons. Whether correct or not, observing this principle certainly leads to considerable added complexity in providing suitable vocabulary enhancing study material to learners. Horst et al.[3] describe a very elaborate web-based system designed to expand academic vocabulary which provides vocabulary items in context and attempts to ensure that the learners engage in "deep processing," i.e., engage with multiple aspects[4] of the item, to enhance retention. But there has always been a substantial number of teachers (and indeed, students) who feel that this kind of incidental learning, though it undoubtedly occurs, is not sufficient nor efficient for vocabulary acquisition, and that vocabulary acquisition itself should be a major pillar of language learning. The case for explicit vocabulary study has been powerfully put by Folse.[5] Using anecdotes and research evidence, he systematically dismisses what he lists as eight popular "myths" which embody the opposition to explicit vocabulary study. However, myths or not, these beliefs have undoubtedly had a strong influence in reducing the amount of research carried out concerning direct vocabulary study. Nonetheless, not all researchers have been discouraged, e.g., Ma and Kelly,[6] and Godwin-Jones[1] describes some of the other work which has been carried out.

In considering whether direct vocabulary study is desirable, it is also important to take into account the learner's current state of knowledge of the target language, and for what reason the language is being studied. Whereas it is possible to argue in favor of exclusive use of the communicative approach with lower level learners, it becomes much more difficult to support this view for learners who have already achieved a reasonable level of communicative competence in the target language, especially in the case of ESP (English for Specific Purposes) learners who need to acquire an extensive vocabulary of specialized terms related to their field. In this kind of case, a considerable amount of direct vocabulary study is clearly essential.

2. Outline of the system

The above considerations prompted this researcher to develop a system which enables teachers to make vocabulary study exercises for deployment in a browser, so that they can easily be made available on an intranet or the Internet. The exercise itself is an Adobe Flash movie, and the system was developed using Adobe Flex 3. A text or xml editor is all that is required to make new exercises, as it is not necessary to edit the Flash movie itself. The content (vocabulary items) and design (font size and color scheme) data are contained in two separate xml files, so that only one file need be edited to change the design for multiple exercises. An exercise made with the system may appear on first sight to be a simple drag and drop matching exercise, where items in one column are lined up with matching items in another column. This type of exercise is usually implemented in one of two basic forms: the first is a direct analog of the classic paper exercise where lines are drawn to join matching items, i.e., having lined up the items, the learner clicks a button to check the answers; the second has no simple paper equivalent, because each item is automatically checked as soon as it is lined up, and rejected if incorrect. A simple extension to the first type, whereby the learner is allowed to continue after checking and rematch the incorrect items, can extend it beyond what is easily achieved in a paper exercise, but the learner can then fairly easily complete the exercise by trial and error without any assurance that the items have been learned. Likewise, in exercises of the second type, trial and error without real learning can easily become a factor.

The exercise produced by the system includes a

feature designed to avoid the above problem, and ensure that the learner has actually memorized the vocabulary items while completing the exercise. An example exercise, with medically-related terms in English and Japanese, is shown in Figure 1. It works as follows: the learner drags an item from the left-hand column and lines it up with one in the right-hand column in the standard way. If the match is correct the dragged item stays in its new position, and if incorrect it returns to the left-hand column, as in exercises of the second type above. However, in addition, other items which had already been lined up correctly also return to the left-hand column, and the order of the items in the left-hand column is randomly rearranged. The only exceptions are items which had already been correctly lined up a number of times (e.g., twice) consecutively. These items remain in position, as they are considered to have been memorized; blind trial and error will eventually yield a correct match, but unless the learner actually memorizes the matched item it will be difficult to place it correctly.

It was thought that a limit should be placed on the required number of consecutive correct matches for an item in order to avoid waste of time and learner frustration from having to redo all the known items

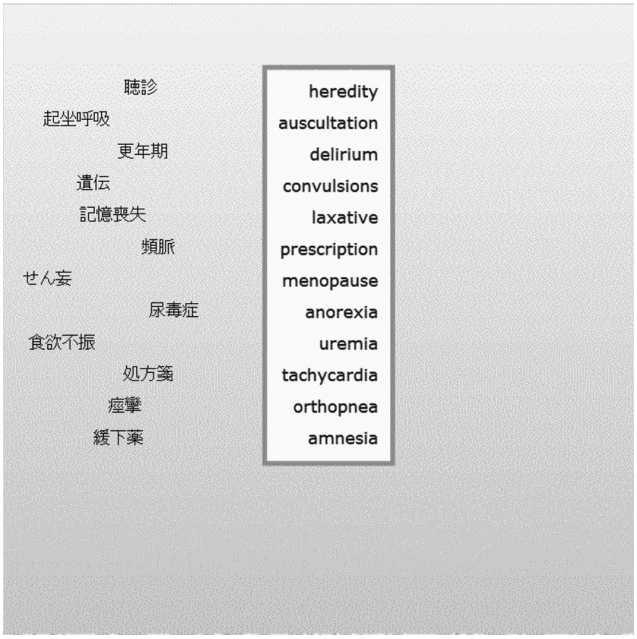

Fig 1a An example exercise in its initial state.

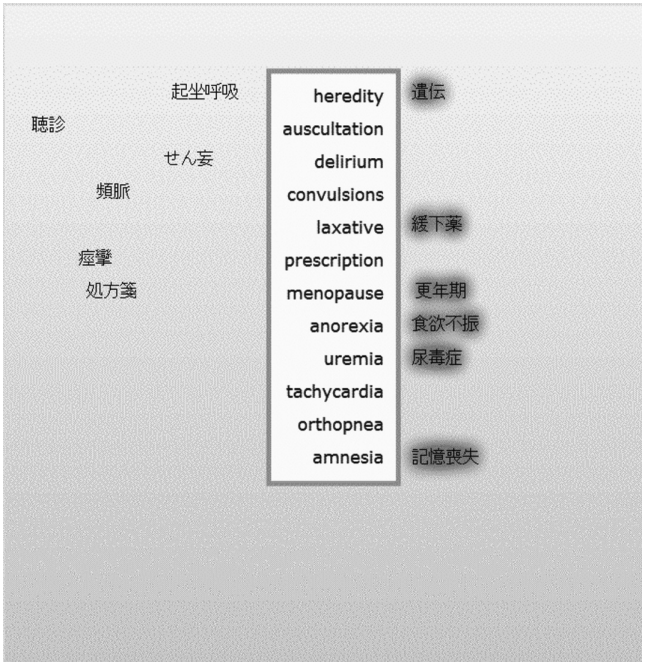

Fig 1b The same exercise partially completed. Correctly matched items are on the right. The color of the glow around them is different for items which have or have not been correctly placed the required consecutive number of times.

every time a mistake was made. The optimum number of times was thought to be probably either two or three, but research is needed to clarify this, and the number is left as an adjustable parameter in the exercise making system. The effectiveness of this method must depend on whether the stimulus of being "forced" to memorize an item in the short term is also an effective enhancer of longer term retention. But at least in the short term, in order to complete the exercise the learners will be encouraged to activate and try to enhance whatever learning strategies they use, which has been shown to have beneficial effects.[7] The strategies used will depend on the individual learner's preferences. Nattiger mentions some popular ones.[8] It must also be noted here that the type of memorization referred to above is in terms of "recognition" (being able to recognize the word) rather than "recall" (being able to produce the word), and there can be considerable difference in the mental processes involved.[9] For learners whose main aim is reading, as with many ESP students, recognition is the most important skill, but learners

who want to ensure recall may need to practice the items further, e.g., writing them out, to consolidate their knowledge.

3. Operation of the system

The system has been made freely available for download from www.mylesobrien.com/esp/vocab. The single zip file contains all the necessary components to be uploaded to the network in one folder, plus an application for editing UTF-8 encoded files. To make a new exercise, this folder should be copied in its entirety, and the two xml files within, *vocab.xml* and *design.xml,* edited according to the desired content and design. The folder may then be renamed as desired and uploaded to the network, and the exercise will work. The default html file supplied, *index.html,* is sufficient for the most basic use, though very simple, merely displaying the exercise at the top left. The educator is free to edit this html file to add any required extra text, links, etc., or to replace it completely with their own html.

A potential problem in the use of the system arises from the fact that the xml files must be encoded in Unicode UTF-8. This is in order to be compatible with Adobe Flash. This requirement is not a problem in itself, since UTF-8 is a powerful encoding scheme which can handle any of the world's languages, and is thus quite suitable for this vocabulary study application. The problem arises if educators edit an xml file containing multi-byte encoded characters (e.g., Japanese) using software which does not handle UTF-8 properly, which will result in nonsense characters. It was difficult to find reliable editing software to recommend for all operating systems, so a simple Adobe Air application which will reliably edit UTF-8 on Windows, Macintosh or Linux systems was developed using the software Adobe Flex 3. Using a specialized UTF-8 capable xml editor is probably the most efficient way to edit these files, as the data itself can be easily edited without any danger of accidentally damaging the tags, but the Air application provides an easy failsafe for educators who require it for whatever reason. It is very easy to use: the file to be edited is simply dragged into the window of the application, where it can be edited as in any text editor, and clicking the Save button saves the changes (see Fig 2)

Fig 2 Interface of the UTF-8 text editor

The xml files themselves are fairly easy to understand. Examples are shown in Fig 3, where the files for the example in Fig 1 can be seen. Fig 3a shows vocab.xml, the content file, which also contains the parameter demandNo which specifies how many times an item must be correctly lined up before it will remain in position even after another item is lined up incorrectly. Each vocabulary pair is shown within <pair></pair> tags, L1 being the item that will appear in the box on the right and stay fixed, and L2 being the equivalent in the other language, which can be dragged and lined up. Fig 3b shows *design.xml,* the design file, which can be understood in reference to Fig 1. The box referred to in the tag names is the box enclosing the right-hand column of items; permGlow and tempGlow (permanent and temporary) are the colors of the glow around a correctly matched L2 item which, respectively, has or has not been placed the required number of consecutive times. The colors are shown as hexadecimal RGB codes, and many reference charts showing colors and their corresponding codes are available easily from the Internet, e.g., http://

www.devguru.com/Technologies/html/quickref/color_chart.html.

Fig 3a The *vocab.xml* file (abridged to 3 items) for the example shown in Fig 1

```
<?xml version="1.0" encoding="UTF-8"?>
<exercise>
<demandNo>2</demandNo>
<pair>
<L1>depression</L1>
<L2>うつ病</L2>
</pair>
<pair>
<L1>arthritis</L1>
<L2>関節炎</L2>
</pair>

(9 PAIRS ABRIDGED HERE...)

<pair>
<L1>bradycardia</L1>
<L2>徐脈</L2>
</pair>
</exercise>
```

Fig 3b The *design.xml* file for the example shown in Fig 1

```
<?xml version="1.0" encoding="UTF-8"?>
<design>
<backgroundColor>0xccffff</backgroundColor>
<boxBgcolor>0xffffcc</boxBgcolor>
<boxBordercolor>0xff9900</boxBordercolor>
<leftFontcolor>0x330033</leftFontcolor>
<rightFontcolor>0x660000</rightFontcolor>
<tempGlow>0x6633cc</tempGlow>
<permGlow>0xff0066</permGlow>
<boxborderThickness>5</boxborderThickness>
<itemFontsize>18</itemFontsize>
</design>
```

3. Discussion

Now that the system is available, its effectiveness needs to be investigated. A couple of informal trials with small groups of students, in which 2 was assumed to be the optimum number of required consecutive correct placements and retention was tested about two weeks later, have been carried out. The results were promising, but far from conclusive. If reliable data from more rigorous investigation can be obtained and prove positive, it should also be worthwhile improving the system in order to smooth the process of editing the xml files. A program with a graphical user interface for adding vocabulary, choosing design features, etc., so that the educator does not need to edit xml directly would greatly enhance the user friendliness of the system.

It should also be noted that the system is not limited to producing exercises in which the vocabulary items are all single words, as in the example. Phrases or short sentences may be used, so that words can be shown in context, though the possible length is limited depending on the font size chosen. This could be useful, for instance, in investigating the effect of contextualization on vocabulary acquisition.

It is hoped that the system will provide an effective and enjoyable means of vocabulary study especially suited to ESP learners, with built-in verification of short-term memorization, and also a useful tool for research on vocabulary acquisition.

References:

1）Godwin-Jones, R.: Emerging technologies - from memory palaces to spacing algorithms: approaches to second-language vocabulary learning, Language Learning & Technology, 14-2, 4-11, 2010 (retrieved from: http://llt.msu.edu/

vol14num2/emerging.pdf).
2) Krashen, S.D.: Principles and Practice in Second Language Acquisition, Prentice-Hall International (UK) Ltd., London, 1981.
3) Horst M., et al.: Expanding academic vocabulary with an interactive on-line database, Language Learning & Technology, 9-2, 90-110, 2005 (retrieved from:http://llt.msu.edu/vol9num2/horst/).
4) Nation I.S.P. : Learning vocabulary in another language, P. 33-34, Cambridge University Press, Cambridge, 2001.
5) Folse, K.S.: Vocabulary Myths: Applying Second Language Research to Classroom Teaching, University of Michigan Press, Ann Arbor, MI, 2004.
6) Ma, Q. and Kelly, P.: Computer assisted vocabulary learning: design and evaluation, Computer Assisted Language Learning, 19-1, 15-45, 2006.
7) Alvari, A.: Strategy activation in learning English words, Academic Exchange Quarterly, June, 2004 (retrieved from:http://www.thefreelibrary.com/_/print/PrintArticle.aspx?id=121714116).
8) Nattiger, J.: "Some current trends in vocabulary teaching" in Carter R. and McCarthy M., Vocabulary and Language Teaching, P.64-66, Pearson Education Ltd., Harlow, 1988.
9) Yun, S., et al.: Improving recall and transfer skills through vocabulary building in web-based second language learning: An examination by item and feedback type, Educational Technology & Society, 11 (4), 158–172, 2008 (p.157) (retrieved from: http://www.ifets.info/journals/11_4/12.pdf).