Comparing Translation Software and OCR Reading Pens

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This study aims to compare various computerized bilingual dictionaries (CBDs) for their relative effectiveness in helping Japanese college students at several language proficiency levels to access new English target vocabulary. Its rationale was based on several observations and research claims (See Atkins & Knowles 1990; Bejoint & Moulin 1987; Laufer & Hadar 1997) that bilingual and bilingualized dictionaries in general, as well as electronic dictionaries in particular, appear to be much more rapid and effective than monolingual book dictionaries for the acquisition of new L2 vocabulary by language learners. The author has been testing and analyzing various CBDs in four major categories for the past two years. These include 1) PEDs (portable electronic dictionaries); 2) Software CBDs; 3) Online dictionary websites; and 4) Optical Character Recognition/ Translation (OCR/OCT) devices; both portable handheld "Reading Pens" (e.g. *Quickionary* or *Quicklink*) and also flatbed OCR scanners (*Logo Vista*) bundled with translation programs. This research began with a dissertation that studied the pre- and posttest vocabulary, comprehension, listening and total reading levels of over 1,000 Japanese college students at six institutions (Loucky, 1996; Loucky, 1997). Since then the author has devised a simple yet practical *Dual Assessment Vocabulary Evaluator*, which helps to more clearly define and test the differences between both L1 and L2 mental lexicons, and also between language learners' L2 receptive

understanding vocabulary and active or productive use vocabulary (Loucky, 2002).

Computerized technology has now made possible multimedia programming with the benefits of interactive processing and immediate feedback. Modern CAI/CAELL, along with well-made CBDs, either online or off, can already be found to scan, pronounce, and translate for us in any direction of the four language skills. The author examined Japanese college students' use of the above four kinds of CBDs as used for more rapid accessing and archiving of new L2 terms, and recommended more informed integration of their use into a systematic taxonomy of vocabulary learning strategies for maximally effective instruction.

This demonstration overviewed the design, testing and results of a comparative study of CBDs as they were used at three colleges (n=43) in Kyushu, Japan from October 2000 to December 2001, examining possible benefits that may accrue from their use. Specific research questions related to the use of CBDs for language education were discussed, data collection procedures described, and an analysis made of results. Related pedagogical implications and recommendations for improving training in the use of CBDs were given, as well as a comprehensive chart comparing 25 CBDs, including websites and software available for bi-directional English to Japanese translation.

この研究は、CBD(二カ国語コンピューター辞書)を用いて、さまざまな言語熟達レベルにある日本の大学生が新しい英語の目標語いにアクセスする際の、相対的な有効性を比較検討することを目標としています。その論理的基礎はいくつかの観察および研究クレーム(Atkins & Knowles 1990 ; Bejoint & Moulin ; 1987; Laufer & Hadar ; 1997)を参照)に基づき、それらによると一般的な二ヶ国語辞書、bilingualized (both L1 & L2) 辞書は特に電子辞書と同様、言語学習者が新しいL2語いを習得するために、本の一ヶ国語辞書よりはるかに迅速でより有効であると言えるようです。　著者は、過去2年間4つの主なカテゴリーにおいて様々なCBDをテストし分析してきました。　そのカテゴリーには、1)PED(ポータブル電子辞書)　2)ソフトウェアCBD;　3)オンライン辞書ウェブサイト4)光学文字読取/翻訳(OCR/OCT)装置、またポータブルで手に持って使用する“リーディング・ペン”　(例えばQuickionary/Quicklink)と翻訳プログラムと組み合わされた平台型のOCRスキャナ(Logo Vista)が含まれます。この研究は、語い、理解、リスニング、リーディングについてテスト前と後レベルを6つの教育機関の日本人大学生1000人を対象に調査した論文から始まりました。(a.1996年著者;あるいはその要約、b.1997年著者) その時以来著者は単純でありしかも実際的な、語い知識基準(VKSおよびテーブルⅠ)を考案しました。この基準によってL1とL2の脳内辞書の違い、さらに言語学習者のL2受容的理解語いと使用可能で生産的な語い(c.著者2002年)の間の差をより明白に定義しテストすることができます。
コンピューター技術は、対話型処理および即時のフィードバックの利点を生かし、今やマルチメディア・プログラミングを実現しようとしています。高性能のCBDを兼ね備えたモデムCAI/CAELLは、オンラインまたはオフラインで、4つの言語技術どれについても、スキャンし、発音し、かつ翻訳してくれるのです。　この研究は、より迅速に新しいL2用語にアクセス、アーカイブに保存できる4種類のCBDについての日本の大学生の使用を検討しのたもので、それらの使用を最大限に効果的な教授法の語い学習ストラテジーの系統的な分類学へと、情報に基づいてまとめあげることをお薦めするものです。
この論文は、単にCBDの比較研究の雛型、テストおよび結果をご紹介することを意図しています。2000年10月から2001年12月まで、九州の3つの大学(n=43)でCBCを使用し、そこから生じる利点の可能性を検討したものです。言

語教育のためのCBDの使用に関連した特定の研究課題が話し合われ、データ収集手順が説明され、結果の分析がなされました。日英双方向翻訳に利用可能なウェブサイトおよびソフトウェアを含む25のCBDを比較する包括的な図表と共に、CBDを使用による教育方法の改善を教育的な見地からここにご推薦致しております。

Despite the rather obvious benefits of using rapid access CBDs, only a minority of Japanese college students are yet using them (6/43 or 14% in this study). Few studies of their benefits have been done—none of portable CBDs as yet known in Japan—so that teachers, parents, and language learners are mostly still in the dark about their great potential as an aid in promoting more effective language teaching and learning. Perry's (1997) study only covered monolingual electronic learners' dictionaries (ELD CDs). This study helps to begin to fill this huge gap, and is especially needed in Japan where vocabulary levels (both required and actual) have been falling. Only 507 words of English vocabulary are now required in junior high schools, and 2,000 in all six years of secondary school, whereas 3,000 words were required about twenty years ago in Japan.

Although computer technologies have claimed to speed up or enhance word acquisition, they have not yet had a strong and lasting affect on how foreign language vocabulary instruction is being approached, especially in more traditional societies like Japan where change and educational innovation come slowly. Other studies (Laufer & Hadar, 1997) have been made to compare monolingual with bilingual and bilingualized (giving both L1 and L2 definitions) dictionary use. This study first makes a brief review of claims in this field, and then contributes to it by adding its findings and recommendations regarding the use of four types of computerized bilingual dictionaries (CBDs), adding a helpful chart which overviews twenty-five different products available for bi-directional English-Japanese translation.

Research gaps and questions to be answered

Among the research questions which this study could help to shed more light on, in order to improve current knowledge and instruction in the field of foreign language vocabulary acquisition, are these five:

1) How can the advanced, high-speed functions of these CBDs be most effectively applied to language teaching and learning?
2) How much more efficient are they in terms of speed, or less accurate and adequate in terms of completeness of definitions offered than comparable bilingual book dictionaries (BBDs)?
3) Are some types of CBDs more effective than others, and if so, what particular technological features and functions are most helpful in the L2 lexical teaching-learning process?

4) Does higher English language proficiency tend to make CBDs more useful, or can they benefit lower proficiency level students equally?
5) Do CBDs help to enhance learners' interest, interaction and motivation levels, and thus help to contribute to higher levels of vocabulary retention?

This study attempts to more clearly define and discuss the relative benefits of CBD use for L2 vocabulary development, particularly to see if they can benefit language learners by giving them both 1) faster technological expediency, and 2) better cognitive efficiency. Having done a thorough review of more than 25 CBDs available for use in Japan, this researcher was also particularly interested in the research question focused on in Laufer and Hadar`s (1997) study, regarding whether monolingual, bilingual or bilingualized dictionaries were better for language learners. He also replicated its comparison of the effectiveness of various types of dictionaries, in this case for Japanese college students (Loucky, 2001).

Statement of the problem discussed in this demonstration

The short-term problem of this study was to determine the effectiveness of various bilingual tools in helping Japanese language learners to access and record (archive) new, unknown target vocabulary. The long-term research aim has also been to determine how different CBDs can be used to help maximize lexical acquisition, since one's vocabulary level has long been known to be one of the most fundamental components of language development in all four communication skill areas. Alderson (2000, p. 99), for example, reports that, "Tests of vocabulary are highly predictive of performance on tests of reading comprehension. In studies of readability, most indices of vocabulary difficulty account for about 80% of the predicted variance. In short, vocabulary plays a very important role in reading tests. Clearly, vocabulary is important to text comprehension, and thus to test performance."

From our testing of 25 different kinds of computerized dictionaries (See Loucky, 2001 for full report), it now appears that various kinds of CBDs can be used to better facilitate the acquisition of both receptive recognition L2 vocabulary and also active recall L2 vocabulary. Among the tools compared in this initial study were CBDs offering single word translation, some full translation software, and finally the latest OCR scanning *Quickionary Reading Pens*. The final goal of this study was to consider whether the latest assistive reading technology present in such products, including the new *Quickionary Reading Pens* and some other CBD software and websites, may in fact be among the most efficient tools yet available for second language learning. If so, developing and teaching more efficient use of such

multifunctional CBDs may well be a hidden "Rosetta Stone," and one of the answers many have been waiting for to help give language learners a way to quickly confirm their guesses of unknown words. Additionally, some CBDS may even be used by students to archive, print, and review new meanings bilingually, as well as to rapidly access pronunciation of these new terms in their target language (L2).

Conclusions and Recommendations:

Not only were CBDs shown to be extremely helpful for the Japanese context, but it also becomes clear that students need much more guidance in maximizing each particular CBD software, website or electronic device's effectiveness for learning how to use their various functions to help at each stage of processing new words using different essential lexical processing strategies as briefly outlined in the above taxonomy. Teachers and students need to become more familiar with the various features and functions available in each type of CBD in order to make maximum use of them for more effective language learning.

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Resources

Quickionary. (2000). Wizcom Technologies Limited. Assistive Reading Pen that scans, translates and pronounces available from http://www.wizcompjapan.com/.

Appendix 1

Comparative Study of Japanese College Students' Computerized Bilingual Dictionary Use

(Dual Study of 2 Parallel Groups A vs. B and C vs. D were done. PR=Passive Recognition vs. AP=Active Production)

PROFICIENCY LEVEL/ SCHOOL/MAJOR: Class Average Access: (#words by means of:) Total N=43	A. Pre-Advanced (KIT Period 1) Average Time to Access 10 Words: (n=13) Engineering	B. Intermediate Level; (n=13) (KIT Per 2) Engineering Average Time to Access 10 Words:	C. (Women's Jr College) Upper Intermediate Average # Words Accessed in 10': (English Majors) (n=9)	D. Lower Intermediate Average # Words Accessed in 10': (Computer School) (n=8)
A. QUICKIONARY USE: words accessed	5.2'	6.8' Average; 4th Fastest this Group	10	17.25 (Ranked 2nd)
B. PORTABLE CBD DICTIONARY USE (Electronic/Phone)	5.9' 6.25'	6.06' 2nd Fastest for this Group; Phones 10.5' Av for 12; 5th	8.25	19 (Ranked lst)
C. PC CBD SOFTWARE USE	5.56' PC Brother's Tsuyaku/Korya 98	5.83' Fastest Means for this Group	9 (DiTonic on PCs); 9 (Brother Trans); 9 MacJ Dictionary	11.14 (Ranked 4th)
D. BOOK DICTIONARY USE	7.2' (Slowest for this Group: 5th)	6.6' Average 3rd Fastest Means	10	16 (Ranked 3rd)
E. TOTAL WORDS Accessed Per Class:	40-50 Words (two also could use I-Mode Portable Phones: 6.25' Ave. 10 Words)	40-50 Wds (12 also used Portable Phones: 10.5' Ave. to access 10 Wds (Wds=Words Accessed)	43.5 Average	61.25 word average (about 1 word/min.)
F. FAVORITE DICTIONARY USED	A. 16.7% Book D. B. 33.3% PC Dicty. C. 33.3% Elect D D. 25% Quicky E. None 4 Phone	A. 31% Book BBD B. 19% PC Dicty C. 37.5% Elect D D. 6.25% Quicky E. None 4 Phone	100% would like CBD; 75% Bilingual Book Dictionary Users	50% preferred Quickionary (Quicky) over all CBDs
G. Class Average Vocabulary Grade Level (Native Norms)	Grade 5.18 Average PreAdvanced Level VKS PR 75.84%; VKS AP 77.07%	Grade 3.28 Average Lower Interm Level VKS PR 61.58%; VKS AP 72.74%	Average Vocabulary Level Grade 3.5 Upper Intermediate English Majors	Average Vocabulary Level Grade 2.5 Computer School

H. DICTIONARY USE HABITS:	A. 31% Book Dicty. B. 1 Elect-- 8% C. 2 Phone CBDs 15.4% (Online)	A. 31% Book Dict B. 1 Elect-- 8% C. 1 Elect-- 8% D. 3 Phone CBDs 23% (Online) (Loaned to Others)	Only 1 Regularly Uses Portable CBD	3 Regularly Use Portable CBD, 1 for 5 years; 2/3 Chinese Used English-Japanese Dictionary
I. PREFERRED AS POSSIBLE GIFT: (If you could receive any of these as a free gift, which would you most prefer?)	A. Book—None B. PC Soft—25% C. Elect--25% D. Quicky—58% E. Phone CBD--0	A. Book—None B. PC Soft—19% C. Elect--31% D. Quicky—44% E. Phone CBD--0	100% would like to own a Quickionary	78% would most like Quickionary as a Xmas Present.
J. BEST FOR KIDS? Some Engineering students thought both Bilingual Book and PC Dictionaries are needed by children to learn English better.	Engineering class 1: A. 75% said Book B. 17% PCs C. 8.3% Elect Ds D. 0% Quicky E. Phone CBD: 0	Engineering class 2: A. 37.5% said Book B. 62.5% PCs C. 37.5% Elect Ds D. 25% Quicky E. Phone CBD: 0		
REASONS WHY PREFERRED: Quicky=Quickionary Reading Pens	Students saw Quickionary as fast & easy to use. Several said PC Translation Software was fast & easy to find typing. PC was also said to be good for kids' IT	Quickionary was preferred by 58% over others as a gift. Said to be easiest to use since no typing entry is needed. Also desired for its Pronunciation ability.	Found Quickionary to be the Fastest Way to Find New Words; Portable Electronic CBDs were #2 in student preference. Some were new owners. Dicty=Dictionary	3 Used to Portable CBDs; 50% most enjoyed using fast Quickionary: found it amusing/learned most new words. One preferred more detailed Book Dicty. explanations

Appendix 2
Vocabulary Learning Checklist: Applying Taxonomy of Vocabulary Learning Steps, Skills and Strategies

1) Assessing (Pre-Test)	2) Accessing--	3) Archiving--	4) Analyzing--
Assessing Vocab. Level by VKScales; Number of Headwords or Standard Native Reading Test	MEANING-FOCUSED Accessing Definitions: L1/L2; L1 & L2 (Rapid Access & Recall)	Record Definitions with Means to Recall/Study (Rapid Recording Best)	ROOTWORD-CENTERED Word Analysis of Base, Affixes/ Suffixes
Use EAP VKS Sample	"Bilingual is Best"	Quickionary OCR/CBD	Word Origins/Grammar

5) Associating—by Semantic Field Keyword Approach= Categorizing by Related Classes by Keywords	6) Activating—USE- FOCUSED (New Words/Phrases Activated by Productive, Expressive Use	7) Anchoring—in one's short-term memory (ST) until it becomes fixed in Long-Term Memory. Use Mnemonic Devices.	8) Reassessing, Reviewing and Recycling --Measure Vocabulary Growth/ Change by #1 Post-Test

Appendix 3
Comparative Computerized Bilingual Dictionary Chart

CBD Name/Type	Cost/Benefits	Features/Functions:	Advantages/Applications for Language Study
Learnout & Houspie's Power Translator PRO7	$100 for English, Japanese & 5 European	Translate Full Sentences	Multilingual Use Interface Seamless Integration
Learnout & Houspie Easy Language 61 ("See, Hear, Say it")	$150 for 61 Languages, Pronounces 125,000 words/ 21,000 phrases	Voice Print Technology Interactive; Essential Vocabulary Focus	Interactive Learning Games; Multimedia Video Photo Tours
Universal Translator	$250 for full suite	Translates 40 Languages Text to Speech & Self-Read Voice Translation	Seamless Integration; Spell Check 35 Languages Poor quality for Japanese
Brother Tsuyaku	10,000 Yen	Full phrase translation ability	Excellent quality for reasonable price
Ditonic (East Joy)	NA Very rapid access	Uni-directionality, only English to Japanese	Enhanced grammar study of various word forms
MacJ Dictionary	Shareware	Rapid access English, Japanese, Korean	Rapid search functions
System Jisho (Mac)	System Shareware	Clear & User-friendly	Bi-directional searches
Pocket Transer : Mac/PC	20,000 Yen	Full Translation; Save & Print Functions	Excellent rapid access; archiving & printing
Atlas, V7	$450/Expensive	Limited English to Japanese only	
Unico Sura Sura Series	Pricy separate OCR & Translation Packs	6 Languages Available for OCR/ Translation	
Honkaku Tsuyaku (Sourcenext)	5,500 Yen; Expensive Add-on Tech. Lexicons	Bidirectional with Voice Translation	
Soiku Hayawaza JET	14-20,000 Yen 2 Versions	Choice of 6 Technical Vocabulary Areas: Add-on ESP Lexicons Extra	High-speed translation ("14 pages in 29 secs.")
Tsuyaku Ichiban (Souiku)	8,000 Yen	Uses Pocket Transer as its database	
Tsuyaku no Tetsujin	3,500 Yen	Uses Pocket Transer as its database (ASCII)	Disadvantage: EJ & JE are sold separately
Tsuyaku Pikaichi, V3	7,000 Yen	Bi-directional: Works in Office XP/ 2000, Word	Translates PowerPoint
Tsuyaku Office	6,000 Yen	Translates ME/95/98 or NT4/2000 Documents	

Tsuyaku Ohsama, V4	6,000 Yen	Internet/E-biz Aim: for All platforms/ Java	Works with Linux, Lotus Notes, etc.
Translator Korya 98 Ippatsu Tsuyaku & Loga Vista X	$200 Logo Vista OCR/ $100 Translator only. 8 Available Languages.	Reads Text to Speech, Translates Spoken or Written Input: 8-14 man	Translates most MS Office & 2000 Pro Documents as well as Websites/Email.
Quickionary Reading Pens	$2-250 US	OCR Handheld Scanner Very fast 1' CBD	L1 translation & L2 pronunciation capabilities
Eijiro	$4-500 US	Very fast	With sound
Ippatsu Tsuyaku	Comes w. some Fujitsu		
Rakuchin	Fujistsu system soft	Bidirectional	With sound
Bookshelf	Shareware; Must have CD to use	Several data bases	Word, grammar, kotowaza, grammar, bios.
Cannon 300 PED	7,000 Yen	3 Archiving Functions	Idioms, Related Phrases
EZ-Word PED	4,000 Yen	No Archiving	
Seiko II PED	3,000 Yen		Limited English Meanings
ALIS Gist in Time	http://www.alis.com/cgi-bin/transdemo.pl	10 Languages Available	Free Service
InterTran	http://www.tranexp.com/2000/InterTran		Free Service
Language Engineering Corporation	http://www.lec.com/demo/frame.html		Purchasing Fee
Amikai Web Translation Engine	http://www.amikai.com/	Used by various sites Can do 24 Language Pairs including URLs!	Free Service; Excellent quality for news, etc. Printable quality
AltaVista Babel Fish Translation	http://world.altavista.com/tr	Systran Internet World Keyboard	Free Text or Website Translation of 12 Languages
Excite Japan	http://www.excite.co.jp/world	Uses Amikai Engine	
@nifty Global	http://www.02.so-net.ne.jp/~suyama/	Uses Amikai Engine	
Cafeglobe	http://cafeglobe.com/café/wotg/index.html	Requires Members	Website Translation
Contact Author at:	http://advancedvision.featureditems.com/	jloucky@mx7.tiki.ne.jp	(Fax/Call: 093-583-5748)