

## **Making the Most of Search Engines for Japanese to English Translation: Benefits and Challenges**

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### **Bio Data:**

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### **Abstract**

The number of Japanese universities offering translation and interpretation courses as part of their language programs has been steadily increasing. Little research has been conducted, however, to explore the potential benefits of search engines for the purpose of correcting and revising text translated from L1 into L2. Close to 200 university students in science and engineering participated in this study and validated the usability of the Google search engine for translation purposes. Specifically, this study compares and evaluates the effectiveness of the traditional dictionary-based approach to translation versus the Google-based method. Participants were required to revise a scientific abstract. An analysis of the two sets of data reveals noticeable improvements in the naturalness and accuracy of the participants' translations of the abstract. The use of the search engine proved not only valuable in developing the participants' autonomous learning capacity, but also helped overcome difficulties with articles and syntactic number, problems most commonly encountered by Japanese students of English. A discussion of questionnaire responses is included at the end of this article to measure the participants' attitudes toward search engines after implementing this study. The results of the questionnaire show positive benefits as well as potential challenges associated with the Google-assisted exercises in translation.

**Keywords:** translation into L2, search engine, authentic materials, Japanese EFL students, autonomous learning

## **Introduction**

Previous studies in computer-based writing aids have documented beneficial effects of computer technology on developing second language writing ability (Hawisher, 1987; Higgins, 1995; Milton, 1997; Pennington & Stevens, 1992; Phinney, 1989), and a large body of literature exists on concordance programs on the Internet and computer software (Lixun, 2001; Sinclair, 2004; St. John, 2001; Whistle, 1999). As it stands, however, investigating the effect of search engine-based translation in a university EFL setting has not yet appeared in the literature, despite the increased recognition of the educational potential of the Google search engine (Ando, 2003; 2004).

This article is a case study that examines the applicability of search engines to English translation within the context of autonomous and independent self-learning. The first step of this study involved having participants translate linguistic material (i.e., the scientific abstract as presented in Appendix 1). They then completed two steps: 1) used an online dictionary to confirm the meaning of the terms and 2) revised the linguistic material in small and manageable units by performing a full-text search and finding the particular word strings in natural text. Note that the present study does not assume that improving learners' ability to translate a technical abstract from Japanese to English constitutes improvement in L2 writing. Translating itself is a specific skill and is not the same as writing or composing original sentences in an L2.

The article is divided into five sections as follows: 1) The background, consisting of discussions concerning English as the world language for science, 2) contrastive rhetoric studies, 3) concordance programs, 4) the current state of English education in Japan and the needs of students, and 5) language direction. The methodology section provides sample sizes and a description of the research design. A data analysis is presented in the results section, together with a follow-up questionnaire about how the participants felt about the translation task. Summary and conclusions contain a discussion of the advantages and limitations of search engine-assisted translation. The linguistic material (Romanized), the handout (translated from Japanese into English), a sample English translation, the questionnaire form (translated from Japanese into English) and examples of comments received through the questionnaire (translated from Japanese into English) are all included in the appendices.

## **Background**

One underlying justification for introducing the idea of search engine-based L2 translation is to help advance the role, scope and depth of Japanese science and technology research in English-speaking communities. Japanese scientific inquiry is high enough to be at the world's leading level, but many Japanese scientists struggle to compete globally, partly due to language and cultural barriers. Although science is supposed to be universal and independent of linguistic and cultural differences, a considerable number of international scientific papers and articles are published in English. Naturally, these publications include research papers and reports translated into English from other languages. Thus, it would be helpful for students, while still in school, to learn useful translation skills.

From this, the question that arises is: "How complex is the English language as used in the field of science?" Studies indicate that high competence in a target language is required of second language writers (Burrough-Boenisch, 2003). Often, non-English speaking authors are barred from the opportunity to disseminate their research findings to an international public due to language issues. Writing in a second language is clearly a challenging undertaking in any discipline. As Baker (1992, p. 64) points out, a person's competence in practically using the idioms and fixed expressions of a foreign language rarely matches that of a native speaker. This applies as much to collocations and sayings, the overall richness of vocabulary and the rhetorical style of text.

Scientific English, however, has several appealing properties for second language authors (Kurdyla & Flynn, 1984). Scientific and other forms of technical writing are characterized by a clear and unambiguous style, unlike literary texts, which require first-hand knowledge of the rhetorical structures of the target language, cultural contexts and figurative language. Furthermore, regardless of the author, chances are that there is little difference in the end product. Attention must eventually be extended to stylistic considerations and other important compositional elements, but direct translation is quite possible with scientific texts. My argument, and the premise of this study, therefore, is that with diligent practice and sustainable use of the methods introduced in this study, researchers and laypeople alike can produce more idiomatic English than what they could have otherwise achieved with conventional paper dictionaries. Needless to say, translation software could do more harm than good as the output that results from the program is not semantically or grammatically synchronized.

The motivation for using the Internet as an aid to developing second language learners' translation skills comes from studies on contrastive rhetoric (Leki, 1991). This area of research in second language acquisition identifies problems in composition encountered by second language writers and refers the problems to the rhetorical

strategies of the first language (Connor, 1996, p. 5). One of the foci of research in contrastive rhetoric is that successful writing in a language goes beyond a solid command of the grammar and lexicon of the language (Kirkpatrick, 2000). Little (1997, p. 228) argues that learners can reshape, reuse or recycle authentic written texts in a whole variety of ways; for example, they can borrow words and phrases from authentic texts to construct sentences of their own. A Japanese speaker translating Japanese text into English, for example, could refer to authentic English materials on Google and borrow words and phrases from those authentic sources. Thus, practical uses of authentic materials offer enormous potential for improving translation quality.

The idea to use Google to translate phrases and to find word strings has been observed in previous studies through concordance programs on the Internet and computer software (Tribble & Jones, 1990). Concordance software searches through large quantities of text, i.e., corpora, to find all the uses of a particular word or collocation and provides the opportunity to use relevant, authentic and original examples as opposed to self-created, textbook examples. While usually difficult for beginners, concordance software can be useful for clarifying various points of interest to advanced students of language, linguistics or a related subject. In language teaching, concordancer and monolingual text corpora have been used to promote vocabulary building and to explore the grammatical and stylistic features of the text (Aston, 1997; Flowerdew, 1993, 1996; Mindt, 1997; Minugh, 1997; Stevens, 1988, 1991). In translation studies, the use of parallel corpora, which consist of text in one language and its accompanying translation in another language, is growing both as a tool for translators and as a way to analyze the process of translation (Baker, 1995; Bowker, 1998, 2000; Zanettin, 1998, 2001). In his analysis of English/Spanish parallel texts, Barlow (1996) suggests that the use of corpora and a concordancer allows everyone, from the theoretical linguist to the student learning a second language, to become a researcher.

It can be seen from the literature that corpora have already been successfully employed in a number of studies. One problem with existing corpora, however, is that they are typically domain specific and only supply a limited range of topics and text types. In recent years, efforts have been made to expand the range and size of corpora; the construction of the 100 million-word British National Corpus is one such attempt. The Cobuild corpus, which is a collection of computer-readable texts of modern English drawn from a variety of literary sources and from a variety of language cultures, became the Bank of English and totals 525 million running words as of 2005. These resources are certainly voluminous and useful, but they still do not adequately meet the acute

needs of translators working on difficult text with specific terminology.

Professional translators today turn to the unique characteristics of search engines to choose the best equivalencies depending on frequency of use and collocation. Major search engines such as Google and AltaVista display, next to hyperlinks, concordance-like listings of text with the target words highlighted. These search engines incorporate sophisticated services since they are, by default, retrieving information from incredibly complex collections of data. Meanwhile, language professionals and software engineers have undertaken initiatives to develop the means to access web text. WebCorp and KWICFinder are stand-alone web concordance tools that ride on a commercial search engine. Despite the potential limitations search engines may place on use, they continue to help translators uncover meanings for unknown technical terms and determine the most common way of expressing ideas in different languages. While this approach requires careful scrutiny and some basic strategies, it does improve the ability of non-native translators to use more idiomatically correct English expressions. How relevant, then, is the learning of translation for students with little linguistic background?

In a typically teacher-centered framework (Mantero & Iwai, 2005), learning English in Japan has traditionally been seen as a tool to pass rigorous entrance examinations, where emphasis is placed on grammatical constructions and reading comprehension. Although these linguistic skills, taught at junior and senior high schools, are useful, supervised practice consisting of repetition and lexical drills does not give the students the problem-solving, communication and thought processes that they need for success in tertiary academic programs. In response to the growing internationalization of Japanese business, the Ministry of Education, Culture, Sports, Science and Technology (MEXT, 2003) is giving special consideration to English communication abilities as a vital linguistic instrument. In this regard, a number of Japanese universities, colleges and tertiary-level vocational schools have started to offer TOEIC (the Test of English for International Communication) preparation courses to provide students with the fundamentals needed to successfully obtain a higher score on the test. A test-oriented approach, however, does not give the students sufficient opportunities to invest effort into improving their English translation skills. In a typical TOEIC training class, learners practice taking the test in samples as short as one question at a time, using mock exams. The teacher explains why the answers are correct or incorrect. Students are also made to listen to audio segments and answer questions based on what they hear, followed by the teacher's explanation. In this kind of setting, students learn 1) receptive skills for the receptive test and 2) the rules and generalizations of English that do not

apply to their knowledge for the practical benefit of humanity.

Clearly a strong need exists to develop translation skills in and outside the classroom for a number of reasons. First, regardless of their areas of study, students find they need to write essays and reports in English, especially in the latter stages of undergraduate study and through postgraduate programs. Second, excellent English translation abilities are expected of those who pursue a career in research institutions or other similar bodies. Nelson (2006) observes, however, that second language students are almost always expected to develop (or pre-write) and organize ideas using only the target language, in which they are often not proficient. Additional skills in translating could help these students further develop their English language proficiencies. Finally, assuming that intervention is critical in translation exercises, one might argue that students could improve only through teacher feedback. It is actually not teacher-student interaction, however, that guarantees accuracy in translation. It is only through intellectual and imaginative exploration into immediate tasks that students will improve their translation skills.

This brings up the issue of language direction. While it is beyond dispute that L2-L1 translation is generally considered to be more efficient than L1-L2 for reasons of stronger lexical association, translation into L2 becomes a common practice in countries where native speakers are not readily available (Campbell, 1998). In fact, a substantial amount of translation into English as a second language is being carried out in Japan due to economic necessity. There has long been a strong case for reviewing the role of translation in language teaching and in particular its educational value for university students (Howatt, 2004, p. 312). The translation of texts into the L2 is, in Britain, referred to as prose translation, and has been held with high regard as a viable technique for advanced learners (Stern, 1992, p. 295). In fact, prose translation is widely practiced in many countries as a device for teaching grammar (Stern, 1992, p. 296). This is because translation constrains the writing process: the learner is not free to choose the meanings that he/she must express and therefore may be compelled to explore unknown areas of the L2 grammar (Schjoldager, 2004, p. 135). It can also 1) focus attention on subtle differences between L1 and L2 and 2) reinforce the view that not every expression has an exact equivalent. As Cook (1998, p. 119) observes, there is a longstanding awareness of the formal inaccuracy that can result from an excessive focus on communication, and a realization that translation can help develop accuracy.

## **Methodology**

*The Internet sites*

Two Internet sites are used in this study. In addition to the Google search engine, an online dictionary is used to determine the meanings of specific words in meaningful context.

Web search engine: <http://www.google.com>

Online dictionary: <http://www.alc.co.jp> (Eijiro on the web)

### 1. Web search engine

A search engine is a program that examines a site and stores information about its content. When a search is initiated, the engine searches documents stored on the World Wide Web (WWW) for specified keywords and returns a list of documents where the keywords were found (Yoshimura et al., 2003). The search engine itself is a web page so that the user has to access that web site to be able to use it. There are a variety of search engines on the Internet, which can be broadly divided into two types: 1) those powered by robots and 2) those powered by human submissions. Search engines that use robot crawlers include AltaVista, Google, Excite and Lycos. Human-powered search engines like Yahoo! depend on website submissions by webmasters. Robot search engines index the text content of web pages on the WWW, while directory (i.e., human-powered) search engines deliver search results displayed and grouped into categories. The robot-driven search engine scans its database for pages that contain keywords entered by the user and ranks those pages by the frequency in which the keywords appear on the web page and the position on the page where they appeared. In considering the objectives of this study, Google, one of the most popular robot search engines, was chosen to allow participants to locate words and word strings in natural text.

### 2. Online dictionary

While it is true that paper dictionaries can be carried and used anywhere, online dictionaries have a number of advantages over paper dictionaries (de Schryver, 2003). For translation purposes, online dictionaries: 1) relieve the user from the burden of flipping through pages, 2) implement high-speed search applications, 3) instantaneously support two-way language conversions, 4) include a comprehensive range of everyday phrases and idioms with selected examples, 5) are available via the Internet, and 6) can be used for spelling and stylistic consistency. In addition, online dictionaries provide a wide variety of modern, up-to-date vocabulary and expressions used in real-world situations. They are also useful for translating technical jargon.

### *Objectives*

The major objectives of this article are as follows:

1. Help students learn Google-based translation strategies and introduce them to the richness of authentic texts.
2. Cultivate students' interest and learning initiative and develop their autonomous leaning capacity.
3. Measure students' attitudes toward the Google search engine after conducting the study.

### *Participants*

A total of 176 undergraduate students studying at a university in Japan, completing required units in English, participated in this study. These English courses are designed to teach fundamental grammar and English for qualifications such as the TOEIC. Because the students are not required to complete translations as part of their academic activities, they have little opportunity to develop their translation skills and understand issues involved in translation. All students are science and engineering majors who have backgrounds ranging from mathematical sciences, intelligent mechanical engineering to life sciences and engineering. Prior to entering the university, the students attended mainstream schooling in Japan of twelve years between the ages of 6 and 18, and none had previously lived in an English-speaking country nor attended an international school. It is important to note here that the students were asked to participate in this project without incentive such as extra credit.

### *Materials*

The linguistic material used in this study is an abstract of a scientific research paper (Appendix 1) written by a postgraduate student at the university. Permission to use the material was granted prior to beginning this investigation. The abstract is of manageable length that contains a moderate number of technical terms, and is the sort of material that the participants are likely to encounter in their areas of studies. Although a text of a scientific flavor was chosen in light of the participants' background, the method introduced in this study can be applied to any field of study.

### *Procedures*

The participants completed a set of tasks in the following order:

1. The first task was to translate the abstract in the classroom using both paper and electronic dictionaries (Appendix 1).



2. The next step was to rewrite the abstract using the Google search engine, a process the participants were asked to complete in their spare time outside of class (Appendix 2).
3. Thereafter, the revised translation was completed and submitted. The participants received a copy of a model example (Appendix 3).
4. A month later, a questionnaire was administered to determine how the participants felt about the Google search engine for developing their English translation abilities (Appendix 4).

## **Results**

The author analyzed both the dictionary-based initial translation (IT) and the translation that was revised according to the instructions of the handout (RT). Comparative analysis provides encouraging evidence that significant improvements were made to the RT in terms of syntactic construction and lexical choice, among others. Specific areas of improvement are identified and discussed as follows:

1. Articles and singular/plural
2. Formation of the tense forms
3. Conversion of parts of speech
4. Prepositions
5. Flow of words and sentences
6. Relative pronouns
7. Choosing the right word in the context
8. Switching from passive voice to active

These phenomena are examined below with actual examples of the participants' work. All examples taken from the participants' translations are shown with the grammar and spelling errors left intact. Due to space limitations, two examples for each case are presented.

### **1. Articles and singular/plural**

The English definite/indefinite articles and syntactic number can cause serious problems for those learning the English language. In English, nouns are marked for number, and the choice of article (or no article) must be made for every noun phrase. By contrast, number distinctions are not normally made nor are there any articles in the Japanese language. Thus, whenever a Japanese learner tries to write a sentence in English,

generating the noun phrase requires two difficult choices: 1) should the head noun be singular or plural and 2) which article, if any, should be generated (Bond, 2001). Below I review several examples of how these cases have been dealt with.

#### Example (1)

IT In recent years, EDLC is in the spotlight as a new device storing energy that takes place of conventional storage *battery* while efficient using energy is promoted.

RT Recently, EDLC is brought to attention as an alternative new energy storage system to conventional second *batteries* while efficient use of energy is promoted.

#### Example (2)

IT In the thesis, EDLC is apply to Model Following Control but used UPS as storage battery, about voltage change of EDLC according to the effect of output voltage is acted examination, therefore report.

RT This paper reports about *the* UPS which EDLC was used as *a* storage battery, application of *the* Model Following Control, and examination about the effect of *the* output voltage according to *the* change in voltage of *the* EDLC.

In the IT of Example (1), the noun phrase “conventional storage battery” is not preceded by an article, which is problematic because “battery” is a countable noun and cannot stand alone. Here, “battery” is not referring to a specific entity, but to the whole class of objects. There are two main ways of expressing generalizations:

A. By pluralizing a noun, the writer can make it generic.

B. Some nouns can be used with the definite article “the” to signal generic reference.

In the RT of Example (1), the noun “battery” has been changed to the plural form “batteries” according to option A above. Similarly, the incorrect use of articles has been identified and corrected in Example (2). It takes a considerably long time for Japanese learners to master the proper use of English articles. It is always possible to seek the help of native speakers, but the topic of articles is more a matter of intuition and convention than rules; furthermore, language textbooks can only present guidelines with examples. Using a search engine, the learner can independently analyze and develop a sense of articles and number by examining different, yet possible, combinations of word

strings. This can sometimes be a tedious and time-consuming procedure, but is fairly straightforward and easy to become accustomed to.

## 2. Tense forms

English has six tenses: 1) present, 2) present perfect, 3) past, 4) past perfect, 5) future, and 6) future perfect. Japanese verbs have only two tenses, the present and the past, and have neither the present perfect nor the future tense. Given that Japanese tenses do not always correspond one-to-one with English tenses, writers should be reminded that the tense must be changed appropriately in English to ensure natural and precise translation of the original text. Here are some examples of awkward verb tenses that have been fixed in the RT.

### Example (3)

IT In the name of second battery, new energy store device, as it were EDLC, *is noticed*.

RT EDLC *has been a focus of attention* as a new energy storage systems which replaces to traditional secondary battery.

### Example (4)

IT As a traditional second battery that changes a new device for energy storage, the EDLC *is the center of attention* while the efficient use of energy *is promoted* in recent years.

RT EDLC *have been attracting attention* as new energy storage facility alternative to conventional secondary cell while the effective use of energy *has been promoted* in recent years.

Because it is not always possible to use the same tense in English as in the Japanese source text, oftentimes the phrasing will be less natural or even misleading if the tense is not strictly correct in the English translation. In fact, I often see Japanese writers underuse the present perfect. This problem has been addressed in the RT, where the present perfect is used appropriately.

## 3. Part-of-speech conversion

Japanese is considered to be a verb-oriented language, while English is more noun-oriented. That is, the grammatical organization of Japanese is largely verb-based, and lends itself to relational thinking. English, on the other hand, is largely noun-based and linearly organized. Transferring verb-based structures into English, which is usually

grammatically possible, is a major cause of awkward-sounding translations. A more natural and concise rendition can often be achieved by transposing these constructions into noun-based structures into English (Wakabayashi, 1992, p. 81). Although the noun-centeredness of English is only a relative trend, and there are numerous noun-centered Japanese constructions, these preferences in the two languages serve as a valuable guideline for J-E translation. The examples below illustrate how the participants learned to transform parts of speech.

#### Example (5)

IT In recent years, *efficiency using* energy is promoted.

RT In recent years, *efficient use of* energy is promoted.

#### Example (6)

IT Since we *apply* Model Following Control for UPS that use EDLC as storage battery and consider effect of output voltage due to variations in voltage of EDLC in the paper, we reported it.

RT This paper reports *application* of Model Following Control for UPS that used EDLC as storage battery and inquest that effect of output voltage by power surge of EDLC.

One of the distinctive features of the language of science is condensed language, where information is densely packed by way of nominalization (Biber et al., 1998; Halliday & Martin, 1993). Examples (5) and (6) illustrate this process of nominalization. It would be difficult to understand this kind of linguistic phenomenon using dictionaries. A search engine, however, can be used for creative discovery; for example, it plays a role in producing valid evidence of the noun-centered structure of the English language.

#### 4. Prepositions

English prepositions are inherently difficult to use due to the lack of a simple correlation between Japanese and English; that is, Japanese uses postpositions instead of prepositions. One difficulty of learning English prepositions is that they are often used as part of phrasal verbs, for example, verbs with a preposition or adverb such as “turn on” or “pick up.” How can a search engine be useful for this kind of problem? Because most search engines ignore prepositions and other small words that are often the key elements of a sentence, in the handout I stressed the importance of using phrase searching, which forces the search engine to search for a string of words next to each other. This ensures higher accuracy and discrimination. Here are some examples where

the participants successfully identified the correct use of prepositions:

Example (7)

IT While efficient use energy promot in recent year, as storage device new energy replace conventional second battery, EDLC has received attention.

RT In recent years, while the effective use *of* energy is promoted, EDLC attracts attention as a new energy storage drive replacing conventional secondary battery.

Example (8)

IT ... and considered *about* the influence of horsepower voltage by voltage change

RT ... and considered influence of output voltage by voltage change of EDLC

In Example (7), the preposition “of” has been added in the RT to make a connection between “use” and “energy.” This student reported that he spent a considerable amount of time on prepositions in the revision process, and found that the number of hits changed significantly depending on the choice of prepositions. Example (8) shows that in English, one can say “talk about,” but “consider about” is not an acceptable usage. *Ni tsuite* (see Appendix 1 for the source text) is a particle meaning “about,” “concerning” or “regarding.” The verb “consider” does not need a preposition such as “about.” As with the areas of articles and singular/plural forms, the correct choice of prepositions can be achieved with a high degree of accuracy and great speed by referencing the vast array of authentic texts available on the Internet.

## 5. Linguistic flow

The intended meaning of the source text can be stymied when a learner struggles to preserve the information contained in the source text, which often results in the reversal of the topic-comment order. This is obviously because Japanese collocations are often unlikely to be rendered into English preserving both their meaning and structure. The following examples show that the IT versions are a mere substitution of words and phrases, resulting in a jumble of words and faulty sentences.

Example (9)

IT The efficient for using energy is promoted in recent years, the EDLC is noticed as the new device of store energy that replaces the conventional secondary battery.

RT While in recent years the efficient use of energy is promoted, the EDLC has

gotten a lot of attention as the new power storage facility that replaces the traditional secondary battery.

Example (10)

IT People promotion that use of efficiency energy in recent years.

RT In late years the efficient use of energy is promoted.

The RT versions are clearer and more precise and accurately convey the meaning of the original text. One of the common errors learners often make is choosing the wrong translation from a dictionary entry. Search engines provide a viable alternative to dictionaries and help learners consolidate and deepen their understanding of how English really works, going beyond isolated examples and instead evaluating language as a whole.

## 6. Relative pronouns

Concise writing requires specific attention to word choice and sentence structure, which involves: 1) eliminating unnecessary elements, 2) minimizing repetition, 3) using fewer words to describe the same thing, 4) not restating the obvious, 5) using simple sentences rather than complex ones, and so on (Negishi, 1999, p. 143). Among these, the heavy use of relative pronouns or the conjunction “that” by Japanese writers can be superfluous or distracting to English-speaking audiences. The word “which,” however, can be used effectively in a clause that provides additional information about the antecedent without changing the primary meaning of the sentence. This so-called non-restrictive clause gives the reader more information about the topic, and is always separated from the main part of the sentence by a comma or a pair of commas if it is in the middle of a sentence. The examples below show the phenomena of relative pronouns and the conjunction “that,” respectively.

Example (11)

IT EDLC is being payed attention as shift to the new machine for storing energy from the second conventional battery

RT EDLC, *which* replaces traditional secondary cell as the new energy storage device, is have been a focus of attention recently

Example (12)

IT This paper shows *that* students apply Model Following Control to USP which EDLC is used as a storage and study effect of output voltage for the change of EDLC’s voltage.

RT This paper reports consideration of effect of voltage change of EDLC which is generated by applying Model Following Control to UPS that used EDLC as storage battery.

In Example (11), the relative pronoun “which” introduces a non-restrictive clause, while in Example (12) the conjunction “that” has been deleted. Although the use of “that” is never wrong and makes a sentence easier to translate for second language learners, clarity and conciseness can often be achieved without it. In Example (12), the student replaced the verb “to show” with “to report,” which is closer to the Japanese original text in meaning, and turned the verb “to consider” into the noun form “consideration” as a direct object of the verb “to report.”

#### 7. Context-based word selection

Google can search a wildcard word within a phrase, where an asterisk is used to match any word in that position. The asterisk represents any one single word in that exact position. For example, to find an American financial exchange of some sort based in Chicago when one does not know what exactly the financial exchange is called, a wildcard search may be a practical option. Entering the text “Chicago \* exchange” will yield a large number of hits for “Chicago Mercantile Exchange,” among others. Using this technique, learners can perform searches and reformulate their queries by looking at the search results and seeing what they might use in addition to what they have thought of. A few of these examples are presented below:

#### Example (13)

IT In this thesis, I report to my examination that is about *influence* of output voltage by changing of EDLC’s voltage ...

RT This paper report discussion about an *effect* of voltage change of EDLC to output voltage ...

#### Example (14)

IT ... and considered about *influence* of voltage output due to voltage change of EDLC

RT ... and deliberation of *effect* of output voltage by voltage change of EDLC

In both of these instances, the word “influence” has been replaced with “effect,” which is obviously a more appropriate choice in this context. The student in Example (14) reported how he conducted the search, and for the purpose of this study, his comments

are reproduced in full below:

“In some instances, the Japanese language has a single word for a particular concept, but depending on the intended nuance, there are probably a great variety of equivalent words in the English language. Therefore, I started by determining all possible definitions from the Eijiro, and then verified the number of hits for each word. Ultimately, I chose the definition that returned the largest number of hits. Considering the phrase at issue, the Eijiro gives multiple definitions for the word *eikyoo*, including: aftermath, bearing, effect, impression, infection, influence, operation, print, pull, shadow, slipstream. Starting with “influence of output voltage,” I replaced each of these dictionary definitions with the word “influence” and compared the search results. While the phrase “influence of output voltage” returned 15 hits, “effect of output voltage” retrieved 23 hits, “operation of output voltage” nine hits, and the rest no hits. For this reason, I narrowed down the translation to the phrase “effect of output voltage” and thus completed my search.”

#### 8. Grammatical voice

The choice between active and passive voice has long been a debated topic in English writing. In terms of readability, the active voice is, in general, considered to be more concise and direct. The fact that there are many sentences in Japanese where the subject is implicit makes the realization of the grammatical voice rather complex and difficult to manage. There are at least two ways to translate these sentences into English. One is to use the passive voice, in which case it is necessary to omit the subject in the English as well. The other is to make the subject explicit so as to write a sentence in the active voice. In the latter case, however, one must know what the subject is. Because the personhood of the researchers is considered less important than the results of the experiment itself, scientific journals have traditionally encouraged authors to dispense with the first person pronoun such as “I” or “we.” In other words, one of the key elements of scientific advancement is the ability for other researchers to replicate results based on the lab report. Using first-person pronouns runs the risk of indicating that it is not feasible to duplicate the experiment without the original researchers present. This situation has led to an increased preference for the passive voice in scientific papers. The question that arises is whether the passive form *chuumokusareteiru* of the source text should be perpetuated in the translation. The most direct translation of this



construction would be “is being paid attention to,” but such construction is somewhat awkward and reader unfriendly. In this case, it would seem more sensible to favor the active voice over the passive to avoid vagueness, as shown in the following examples.

Example (15)

IT EDLC *is paid attention* as a new energy storage device instead of the conventional second battery recently.

RT EDLC *has been a focus of attention* as alternative new energy storage devices to conventional secondary battery.

Example (16)

IT EDLC *is watched* as a new energy store device that changing a traditional second battery while efficiency using of energy is promoted.

RT EDLC *is getting attention* while efficient use of energy is promoted as a new energy store device that changes a traditional second battery.

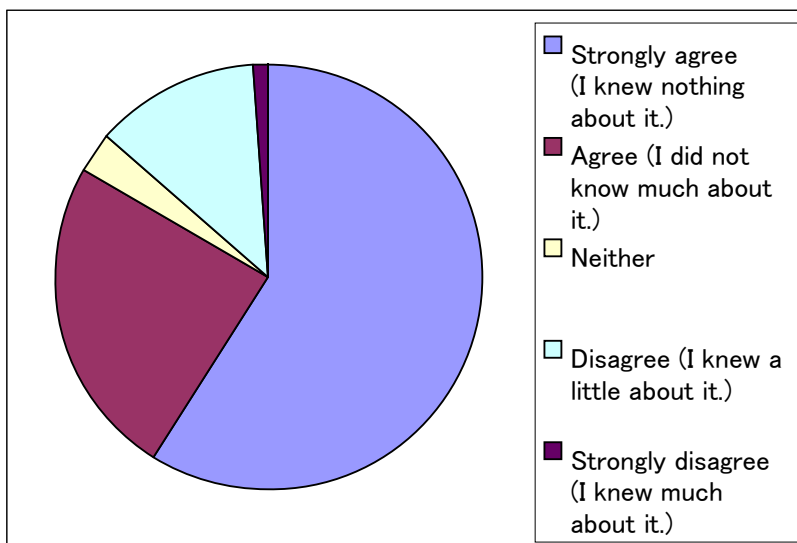
The attempt at the passive-active voice transformation is a welcome change, as the use (or overuse) of passive voice in long or complicated sentences often causes the reader to lose interest or become confused. As these examples illustrate, the revised sentences are noticeably clearer and more direct; they flow more smoothly and are easier to understand than the passive sentences in the IT.

Thus far I have shown some examples of revisions undertaken by the participants of this study. In all examples, the RT is comparatively less erratic and muddled in quality than the IT. It is clear that the long-term benefits of the search engine’s unique capabilities are enormous. Personal commitment and curiosity is essential to the success of Internet-based learning, and proficiency can only be attained through hard work. Of course, some degree of editing by a native speaker will always be indispensable to all second language writers, as mastering a foreign language is truly a lifelong learning process. After all, despite their diligent efforts, most learners will never acquire native-like competence in the second language. My argument is rather that, in terms of formal academic writing, for instance, English-speaking editors will find a piece of writing or translation completed with the use of a search engine more manageable than what could otherwise be achieved using traditional paper dictionaries. How, then, did the participants feel about the capabilities of search engines? The next section discusses the results of the questionnaire survey.

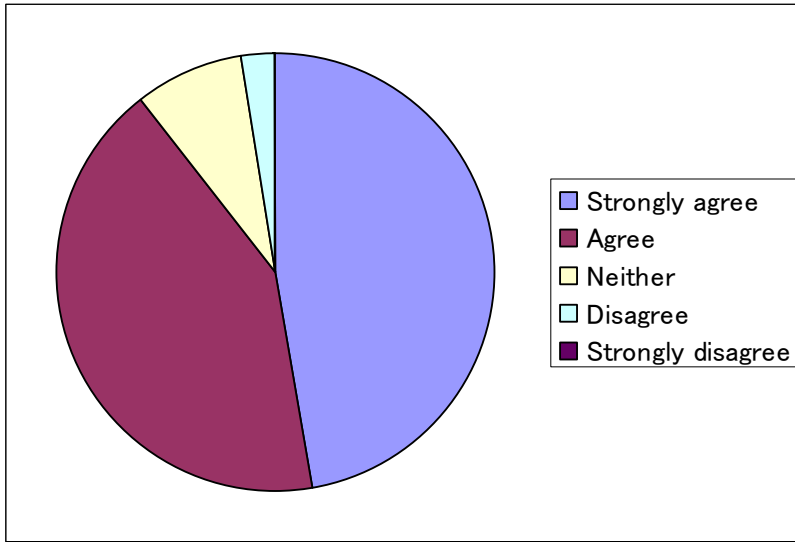
### **Evaluating the questionnaire responses**

A month following the translation exercise, a survey was carried out on a voluntary basis, and the respondents had the option of completing all or part of the questionnaire. A total of 163 participants completed all sections of the survey according to the directions provided. Presented below are 1) figures illustrating how participants responded to each question, 2) some representative participant comments regarding the process, and 3) discussion on how this process can be used in a learning environment.

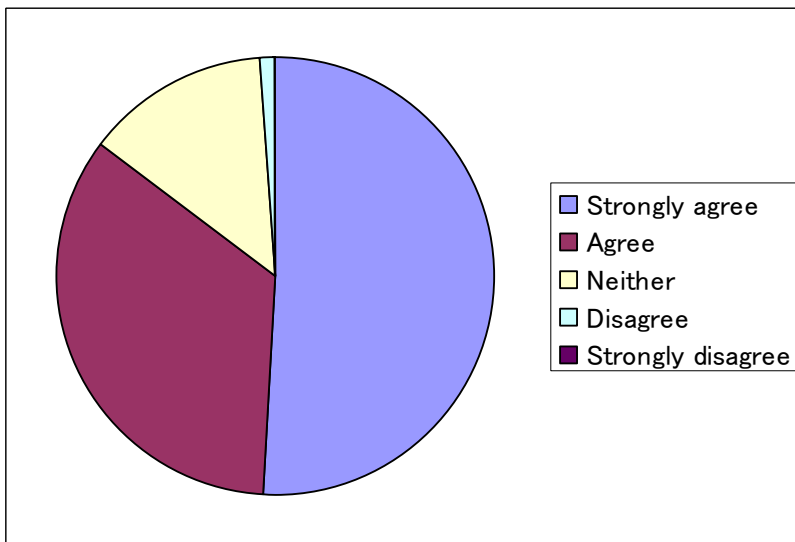
S1: I did not know that these useful functions could be performed using the Google search engine.



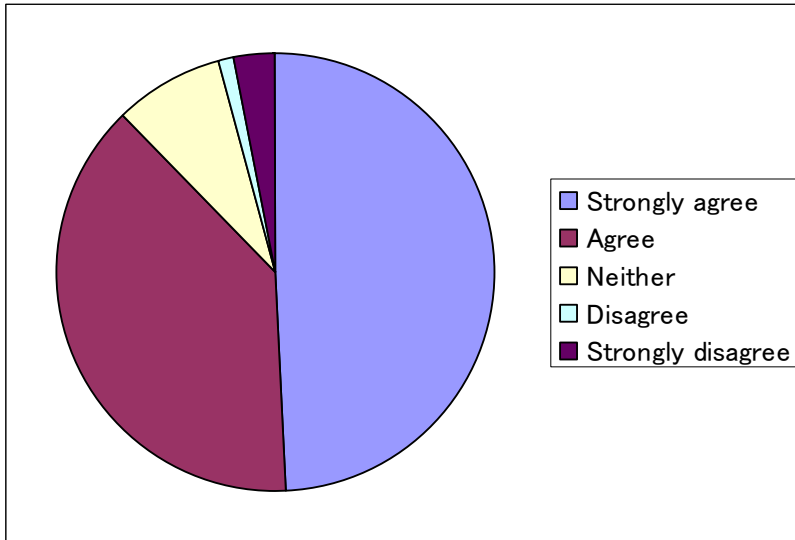
S2: Writers will be able to produce more accurate phrases/sentences by using a search engine, compared to using only paper or electronic dictionaries.



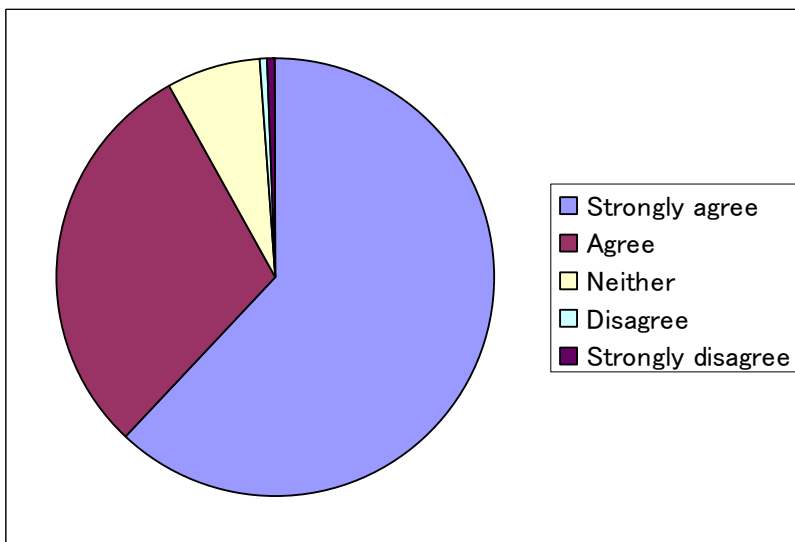
S3: Search engine-based translation can be applied to any field of study.



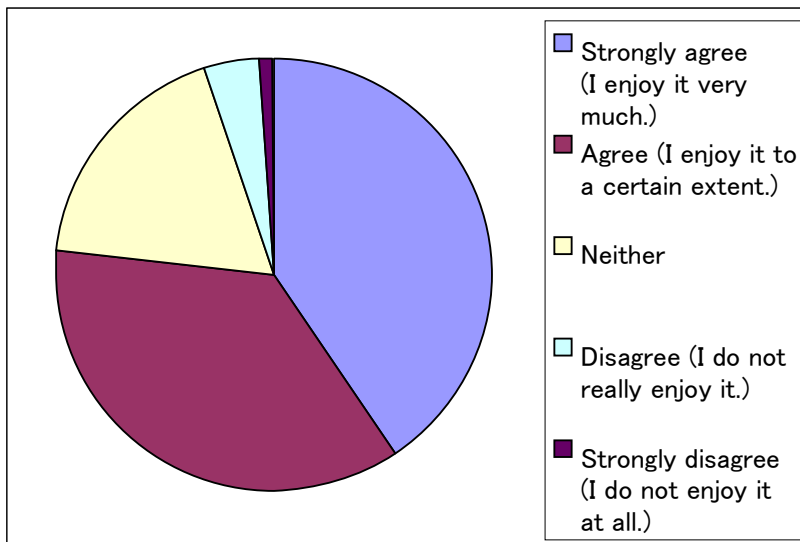
S4: From now on, I would like to use a search engine for English translation requirements.



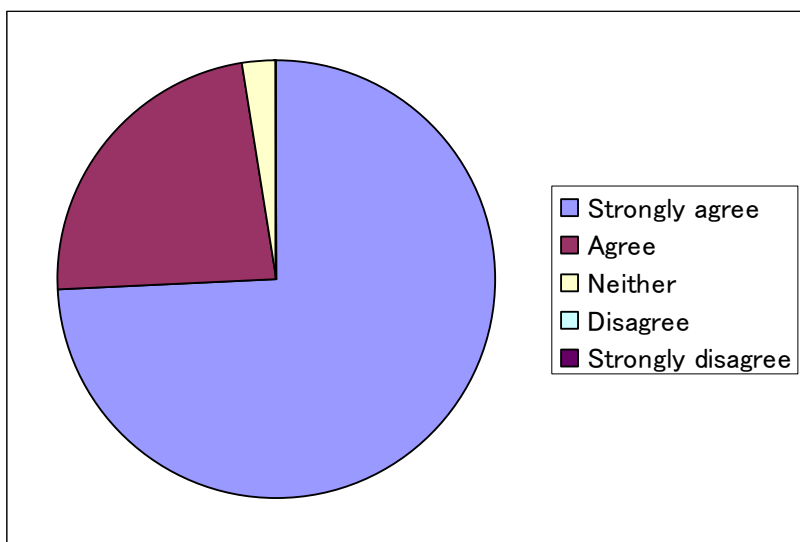
S5: Translation exercises of Japanese (L1) into English (L2) benefit those studying English.



S6: Generally speaking, I enjoy using the Internet.



S7: I want to be able to write English well.



In the survey, 84% of respondents stated that they previously did not know that the search engine could be used for editing purposes, and 89% felt that the method could help writers construct more accurate English phrases and sentences. Similarly, the respondents feel confident that this method can be applied to any field of study. When it comes to personal motivation, the participants have an increased positive attitude

toward the search engine method, with 88% of respondents reinforcing that they are happy to use it as needs arise. A notable 92% of respondents agreed that L1-L2 translation plays a positive role in language development. The survey also found that 77% of respondents enjoy the use of the Internet in general, while up to 97% of respondents expressed the need to improve their English writing skills.

Following are some candid comments on the effectiveness (or ineffectiveness) of the Google search engine. A more extensive set of the participants' comments is given in Appendix 5. First, some positive comments about the method:

*“This is the first time I translated something using the Internet, and in doing so, I learned some basic functions of the search engine. It was quite difficult, but compared to doing translations from scratch, I learned a great deal by looking at many different types of sentences on the net.”*

*“Personally, I’ve never liked writing in English, but this time, having discovered useful search functions, I’ve become a little more interested. I think I would like to try writing something in English using Google when I have a moment.”*

*“I didn’t know that Google could be used this way. I would like to stop using machine translations and switch to Google, which provides plenty of authentic materials written by native English speakers.”*

Next, I turn to some critical or self-reflective comments:

*“In my case, because it took a long time to arrive at correct English sentences (or commonly used sentence patterns in English), I feel hesitant about using this method in the future.”*

*“I didn’t know what to do when a search query returned zero hits.”*

*“Google supplies an enormous amount of information. Obtaining just the right information I required seemed difficult.”*

The anecdotal feedback suggests that the search engine has strong potential for advanced learners, who are resourceful enough to generate a higher number of syntactic/lexical combinations, more so than the less experienced group who expressed

concern about their linguistic inadequacy and the time required to achieve results. One of the major drawbacks affecting beginning and intermediate learners is their utter lack of linguistic dexterity, which would inevitably turn the search engine-based translation task into a time-consuming endeavor.

Despite the inherent disadvantages for the less experienced group, however, the pedagogical benefits of using authentic texts are long standing and widely recognized; they provide means for 1) examining linguistic patterns in situational context, 2) inferring rules, and 3) establishing a link between form and function. In fact, one of the major advantages of applying the Internet is that it allows teachers to steer students toward success in an autonomous learning environment.

The results of the questionnaire also clearly show that the majority of the participants appreciate the usability of the Google search engine as they progress from describing their daily life and personal likes and dislikes in short narratives to demonstrating a more sophisticated use of the language. Although this research is ongoing and it may be too early to draw solid conclusions, I hope to have shown in what ways search engines might be able to help learners improve their translation competence.

### **Summary and Conclusions**

The purpose of this article has been to propose an Internet-based approach to developing English translation skills and encourage university students to become more autonomous language learners. Following the instruction in the handout, the participants have demonstrated their ability to revise their drafts and appraise their own work. In the language classroom, the culture of the target language is often removed from instruction, and average learners do not know better than to use conventional dictionaries for assignments such as translating a piece of material. This article has shown how the search engine could be used to maximize educational benefits and to overcome the flaws of conventional dictionaries or essay writing guides, as long as the learners are not overwhelmed by the time commitment required. In reality, very few Japanese university students have a chance to work with native English-speaking editors through all stages of research and writing, including translating Japanese text into English. Using the Internet, however, it is now technically feasible for second language writers to proofread their own work to a certain degree. The merits of using a search engine are summarized as follows:

1. The method promotes an autonomous learning approach to EFL instruction and helps students develop lifelong learning skills and the ability to engage in

- meaningful academic development.
2. The Google search engine supplements paper/electronic dictionaries.
  3. While it cannot be denied that complex sentence structures will likely pose a challenge to beginners, the method provides excellent control over the linguistic features that cause a great deal of trouble for the learners of English, such as articles and singular/plural distinction.
  4. The use of search engines requires no special technical training. The Internet is independent of time or place and offers a potentially unlimited range of authentic materials.
  5. As the survey results show, the majority of the study participants are delighted to have discovered this innovative method and look forward to trying it in the future as needs arise.

Areas of concern remain, however, which must be addressed:

1. Users must make sense of the huge volume of information resulting from a search, which can be overwhelming for inexperienced or lower attaining learners.
2. Phrase searching can only be helpful when a limited number of words are known, and the words must be typed in the exact order. This requires creative imagination, a natural feel for the target language and a solution-oriented mindset.
3. No search engine understands grammar. The user may create a grammatically incorrect phrase or sentence and mistakenly assume that it is acceptable. For example, one can say “The authors of this paper report that...,” but not “This paper report that...” Obviously, the latter sentence is missing number agreement marker(s). Some learners may fail to pay attention to the internal details of the sentence and start off with “This paper report that.”
4. Depending on the subject matter, a large amount of material appearing on the Internet is, in fact, produced by second language writers, which is sometimes carelessly written. In addition, even work posted by native speakers often contains spelling errors and is of poor style.
5. Unfortunately, many article databases and other electronic resources that would be good starting points are subscription-based web sites.

There is a widespread perception that conventional teacher-centered instruction alone cannot provide learners with the practical translation skills they need to meet the requirements of today's challenging academic standards. Many voices calling for



innovations suggest that, at the very least, classroom-based learning should be supplemented with authentic, contemporary materials that learners can use for independent study. The use of search engines stimulates the development of vocabulary, grammatical conventions and complex sentence structures. While this article is predicated on the assumption that learning a language is fundamentally an individual endeavor that needs to be consolidated by constant practice and sincere devotion, I also wish to emphasize that successful L2 translation is impossible without a good foundation in the basics. Writing on common grammatical mistakes made by Japanese students of English, Webb (2006) points out that the errors are in part due to inappropriate teaching in junior and senior high schools. The author also notes that textbooks and dictionaries are prone to wrong or old-fashioned English. This is a simple reminder to those in the teaching profession that effective and focused teaching of the basics is critical to ensuring learners' long-term success.

It is only through an in-depth understanding of English grammar and practice does computer-mediated learning become a valuable resource for developing the creative approach to the language use. Indeed, search engines are a well-stocked storehouse of free and authentic materials for the second language learner. It is stimulating and instructive to assess the accuracy of a piece of writing/translation via the Google search engine. It is hoped that other researchers, language professionals and teachers of translation courses will confirm the usefulness and reliability of this research using broader samples of language learners.

### **Acknowledgements**

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### **Appendix 1: Linguistic Source Material**

In this exercise, you will receive instructions for translating a scientific text from Japanese to English. By learning a few techniques and strategies, you will practice and improve your English translation skills in your free time. Your first task is to translate a portion of the abstract below by using your paper or electronic dictionaries in the classroom.

*kinnen, enerugii no kooritsutekina riyoo ga suishinsareru naka, juuraino niji denchi ni kawaru aratana enerugii chozoo soochi toshite, denki ni juusoo kyapashita (EDLC) ga chuumokusareteiru. honronbun dewa, EDLC wo chikudenchi (storage battery) toshite shiyooshita muteiden dengen shisutemu (UPS) ni taishi moderu tsuijuu seigyo (Model Following Control) wo tekiyooshi, EDLC no denatsu henka ni yoru shutsuryoku denatsu*

*no eikyoo ni tsuite kentoo wo okonatta node, hookokusuru.*

## **Appendix 2: Participant Instructions (Handout)**

This handout will explain the steps to take to revise the translation that you completed in the classroom.

### **Part 1: Clarifying the meaning of words and phrases.**

You used a paper or electronic dictionary when you completed the first part of this translation exercise in the classroom. Let us first re-examine the accuracy of the terminology you found in paper/electronic dictionaries by using an online dictionary. There are a number of online dictionaries available on the Internet, one of which is called Eijiro, a free, general-purpose dictionary for Japanese/English translators. It contains a broad range of vocabulary, and is widely used by translators working in Japanese and English and also by students of the two languages.

Go to <http://www.alc.co.jp/> and click the white box and type in a Japanese word or phrase for which you would like the meaning in English. What do you see? You may want to substitute the English words/phrases appearing in Eijiro into your original translation if you feel they are more appropriate.

Going forward, we will refer to the sample sentence (SS) below to illustrate some practical search engine strategies to help you find relevant information on the Internet in as short a time as possible.

SS: *tennen gasu wa keizaisei ni sugure kankyoo ni mo yasashii nenryoo da.*

Using Eijiro, the following results should be displayed:

*tennengasu* = natural gas

*keizaisei* = economic efficiency

*kankyoo ni yasashii* = environmentally friendly

*nenryoo* = fuel

Note that the word *keizaisei* is translated as “economic efficiency.” On the same search display screen, you will see an English translation for *keizaisei ga warui* as “be economically inefficient,” which is exactly the opposite of what we are looking for, i.e., *keizaisei ni sugureteiru*. We can thus deduce that “be economically efficient” is a solid translation of *keizaisei ni sugureteiru*.

## **Part 2: Retrieving words/phrases from the Internet and incorporating them into your translation.**

After looking up words/phrases in Eijiro, we will move on to the next activity. We want to find out how these dictionary definitions are used in real context. Since this exercise is designed to help you discover sentence-level errors, let us begin with a technique called “basic phrase searching.”

Phrase searching is when you search for a string of words (instead of just a single word). Because it is used to search for words and phrases, the words must be side by side and in the order given. For example, looking at the SS, we need a translation of “natural gas.” Each one of these words, i.e., “natural” and “gas” has a different meaning if searched for separately and you will retrieve many irrelevant documents if you take that approach. When you string the words together, however, the meaning changes to the very precise concept of “natural gas.” You do this by enclosing the phrase in double quotation marks, i.e., “natural gas.”

Next go to <http://www.google.com>. Google has a rectangular box where you type in one or more keywords that describe the topic or item you wish to find. Enter Japanese word/phrase and its English definition found in Eijiro, inserting a space between the Japanese and English entries. You then click on the “Google search” button. After a few seconds, the search engine will return the number of hits and a hit list giving the name, address, and short description of the information that it found.

How many hits were returned? The number of hits is a reasonable indication of how well your search is progressing. Each hit has a blue-colored underlined hyperlink to the on-line source of that information. If the item looks useful, click on the hyperlink to go to that source. To return to the list of hits, click on the Back button at the bottom of the Netscape window.

As you can see, there are a large number of bilingual sites featuring both the Japanese and English languages. The words/phrases you just typed should appear side-by-side or be placed structurally close together. This will give you an idea of how each Japanese word/phrase is rendered in English. Remember that Japanese phrases are automatically segmented into morphemes and are handled as phrase searching, so you do not need to put them between inverted commas. In addition, note that Google searches are not case sensitive. All letters, regardless of how you type them, will be understood as lower case.

The next step is to enter English words only (for instance, a noun phrase “natural gas”) and identify the speech units which the noun phrase appears. What do you see before and after the noun phrase? Are they nouns, prepositions, adjectives, verbs,

auxiliary verbs? Is there a definite article or an indefinite article before the noun phrase? Can you change the phrase to “natural gases” and get an equal number of hits? Identify the tense and aspect of the sentence for the word or phrase. Check the use of the passive voice. Can you spot the phrase, clause and sentence?

For this portion of the exercise, remember to use phrase searching. You should not encounter problems as long as you get a sufficient number of hits for the phrase for which you are searching. It shows that the wording is actually being used by English speakers in a real context.

If you get zero or very few hits with your first search string, suspect that your submission leaves something to be desired. Here are a few suggestions to rectify the problem.

1. Check spelling.
2. Should the noun (or noun phrase) be singular or plural? For example, you will get 72,800,000 hits (as of September 2006) if you search for “natural gas,” but only 153,000 hits (as of September 2006) for “natural gases.” This is because mass nouns such as “gas” are generally uncountable.
3. Is an article necessary? Use an article or other determiner if you are referring to one or all of a noun. If you decide that an article is necessary, you must then choose an appropriate article. Singular, countable nouns always refer to a specific amount (one), so they always require an article (unless another determiner is present). Plural, countable nouns and uncountable nouns require an article if they refer to a specific group or subset of the noun. Once you have determined that an article is necessary, you must choose between an indefinite article (“a” and “an”) and the definite article (“the”). In general, you should use the definite article if the noun is unique or known to the reader and an indefinite article if the noun is one of a group or new to the reader.

Taking these tips together, modify your search and rearrange articles and syntactic number in all imaginable combinations, for example, “in late eighteenth century,” “in late eighteenth centuries,” “in a late eighteenth century,” “in the late eighteenth century,” or “in the late eighteenth centuries” and pay attention to the number of hits and the context in which each phrase occurs.

Are you ready to revise your draft? If so, use phrase searching, taking words verbatim from your previous translation. The longer the sentence, the less likely it is that you will find an exact match on the Internet. Only a human editor can review and

correct a long string of words. That is why you need to cut up a single sentence into pieces, examine each part closely and then reassemble the sentence in a way that makes sense. Usually, a phrase string of about five to six words will yield satisfactory search results. In other words, you will move forward bit at a time as you go through each sequence. Let us see how this might work with the SS.

Search unit	Number of hits (as of September 2006)
“natural gas is”	1,470,000
“is an economically efficient”	2,730
“environmentally friendly”	20,300,000
“economically efficient and environmentally friendly”	134
“is a fuel”	277,000

We can put these pieces back together and generate the correct sequence of words as follows:

“Natural gas is an economically efficient and environmentally friendly fuel.”

Another useful tool is called “partial phrase searching,” which uses the asterisk (\*) within a phrase to represent a word. For example, when you want to know what kind of an adjective can be used between “environmentally” and “fuel,” enter “environmentally \* fuel.” What do you find substituted for the asterisk in your search results? Besides “friendly,” you will get “safe,” “damaging,” “responsible,” among others. Of course, you can search for any part of speech (i.e., verbs, nouns, prepositions, etc.) using this feature. Note that two or more asterisks (\*\*) will usually return two or more words.

### **Appendix 3: Model Translation of Abstract**

In recent years, EDLC is getting attention as a new energy storage facility replacing conventional secondary batteries. This paper reports the results of: 1) the application of the Model Following Control to the UPS, which used the EDLC as a storage facility and 2) the examination of the effect of the output voltage arising from the voltage shift in the EDLC.



#### **Appendix 4: Survey on Google Search Engine**

This questionnaire has been designed to gather information about your experiences using the Google search engine in developing your English translation skills.

##### **INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE:**

- Please rate the statements in sequential order from S1 to S7.
- For statements with answer categories, please circle the number of the applicable category. For the section where a comment can be written in, please be as specific as possible.

Please do not discuss your answers with others. Please rate the statements using your own ideas and experiences.

S1: I did not know that these useful functions could be performed using the Google search engine.

1. Strongly agree (I knew nothing about it.)
2. Agree (I did not know much about it.)
3. Neither.
4. Disagree (I knew a little about it.)
5. Strongly disagree (I knew much about it.)

S2: Writers will be able to produce more accurate phrases/sentences by using a search engine, compared to using only paper or electronic dictionaries.

1. Strongly agree.
2. Agree.
3. Neither.
4. Disagree.
5. Strongly disagree.

S3: Search engine-based translation can be applied to any field of study.

1. Strongly agree.
2. Agree.
3. Neither.
4. Disagree.
5. Strongly disagree.

S4: From now on, I would like to use a search engine for English translation requirements.

1. Strongly agree.
2. Agree.
3. Neither.
4. Disagree.
5. Strongly disagree.

S5: Translation exercises of Japanese (L1) into English (L2) benefit those studying English.

1. Strongly agree.
2. Agree.
3. Neither.
4. Disagree.
5. Strongly disagree.

S6: Generally speaking, I enjoy using the Internet.

1. Strongly agree (I enjoy it very much.)
2. Agree (I enjoy it to a certain extent.)
3. Neither.
4. Disagree (I do not really enjoy it.)
5. Strongly agree (I do not enjoy it at all.)

S7: I want to be able to write English well.

1. Strongly agree.
2. Agree.
3. Neither.
4. Disagree.
5. Strongly disagree.

If you have any comments you would like to add, please write them below.

## **Appendix 5: Select Comments from Survey Responses**

### **Positive comments**

“I have never tried using this kind of method before. Although I felt at a loss at times, especially not knowing whether the sentences I came up with were correct, I found the approach innovative and fun.”

“Because a dictionary alone gives us multiple listings for English words (definitions) with two or more senses, I could never be certain which word or words to use in a particular context. But using Google, I was able to revise a sentence by reconstructing phrases and replacing words in the selected entry. I know that there will be a lot more opportunities for me to use English due to increased exposure to research papers and technical reports. I would like to use this method whenever possible.”

“Now I know that I can find a lot of examples of correct English sentences using Google. From now on, I would like to use Google for English assignments.”

“I have never used Google for translation purposes before. I wish I had known about this method earlier.”

“The translation becomes too literal with a conventional English dictionary, but using the Internet, I felt that I could discover more English sentences that were closer to how native-speakers may use them. I would like to use this method as the occasions arise.”

“Your handout was comprehensible even to someone like me who had never used Google for translation assignments before, either from Japanese to English or from English to Japanese. I learned valuable search techniques from the handout, which was of high standard. I would like to actively use this method from now on.”

“I think Google is useful in the sense that it can also be used to evaluate the accuracy and appropriateness of other languages. Google is definitely more effective than translation software.”

“I was surprised to see how quickly I could finish writing with the help of Google.”

“I felt assured that an English sentence should be correct when a search returned some results.”

### **Critical or self-reflective comments**

“It was difficult for me to judge the accuracy of English sentences found through the search engine.”

“You are bound to get many fewer hits when a search involves technical terms. When that happens, you are unable to judge as to whether the sentences retrieved are grammatically correct.”

“I used this method for the first time and it was rather difficult for me. I felt that I would have to practice it a lot before I could produce something presentable to the intended audience.”

“Before attempting to master the use of search engines, I felt I lacked a fundamental knowledge of the English language to begin with. I could translate short sentences, but when it came to longer sentences within the broader context, I realized that my English was quite poor.”

“I felt happy when I created a sentence and it returned some hits, but I was discouraged when I didn’t get any hits. I got really down when I received absolutely no results after trying so many times.”

“It was laughable when I searched with a misspelled word and it still yielded many hits.”