Evaluation of Japanese-English CALL Tool Supporting Contextual Language Acquisitions

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Abstract

This paper describes and evaluates the Computer Assisted Language Learning (CALL) Tool, which supports contextual language acquisitions. The CALL Tool searches for and retrieves parallel texts, while aligning unedited Japanese-English parallel texts from the World Wide Web [Pershin, Akahori, 2001]. We compared the proposed tool with an existing system by conducting an experiment that showed our system’s effectiveness in phrase acquisition, discourse-structure acquisition and text comprehension. However, this experiment also exposed the drawbacks of the proposed system, such as a poor interface design. We concluded that the proposed system could be used together with existing systems to increase the number of learning strategies available for language learners.

1. Introduction

Everyone of us has acquired language through context, because this way of acquiring language is natural and basic to native language acquisition. We often use the same strategy, also known as Contextual Deduction, in second language acquisition. Researches [1],[5] show that a large percentage of the words acquired by foreign language learners have been incidentally acquired by the Contextual Deduction strategy.

We are proposing here a new tool that automatically aligns and creates first language (L1) hints (glosses) from the dynamically changing Internet content, and that supports contextual acquisition in foreign language (L2) learning.

2. Theory

At present there is no adequate theory clearly explaining contextual language acquisition, but researchers common assert that the learner can apply, among others, the following strategies [9]:

1. Investigate the context and guess at the unknown word or idiomatic expression
2. Refer to a word list or dictionary
3. Skip the unknown word or idiomatic expression

Laufer and Hill [6] showed that combined L1 and L2 look-up supported Contextual Deduction and improved retention.

Systems that support Contextual Deduction by using dictionary [8] or online dictionaries and human informants [11] have been already applied.

In contrast, we present a system that does not use any dictionary for its L1 glossing. Instead it uses on-line resources to automatically generate authentic L1 paragraph-level hints and expose them to the learner.

However, we are not exactly certain which kind of gloss gives the learner better support for language acquisition. In attempt to answer this question, we decided on an experiment that compares an existing system to our tool, then discussed the results.

3. System

The flow of the Tool is as follows:

Our Tool (hereafter referred as B system) (Fig.1) searches for both a predefined Japanese site (Referred one) and an English site with similar content (Research one), clusters these by date and topic, then translates Japanese articles to English. It then aligns the documents on the paragraph level and stores it to the Translation Memory.

When the learner surfs the web page, where the URL is in the Translation Memory, an agent instantly displays its translation to the learner (Fig 2). For more detailed information about the system see [7].
We summarized the main features of the existing system, Roboword (hereafter referred as R system) and our B system in the following table.

Table 1. Main features of the existing systems and our system

<table>
<thead>
<tr>
<th>Existing Systems</th>
<th>Our System</th>
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</thead>
<tbody>
<tr>
<td>Exposure to word translation</td>
<td>Exposure to paragraph level authentic text translation</td>
</tr>
<tr>
<td>Can be applied to every site</td>
<td>Application ability is restricted</td>
</tr>
<tr>
<td>Has a static vocabulary which can be detrimental in time-sensitive or special domains</td>
<td>Has a dynamic vocabulary</td>
</tr>
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</table>

We would also like to emphasize the role of language instructors in selecting the learning content. They should choose a Referred Site that is:

- Interesting for their learners [2]
- Adjusted to the learner’s language levels

4. Experiment

Our hypothesis was that the exposure of the authentic L1 hints will facilitate contextual language acquisition and improve the Contextual Deduction strategy. We chose the subjects who satisfied the following requirements:

- Possess a large enough vocabulary to effectively use contextual deduction strategy, [4]
- Have high motivation
Our subjects were 10 English-language learners (4 females and 6 males) with intermediate or high English proficiency levels and intermediate Computer skills. Their average age was 29 years. All subjects had great interest in learning the present content.

The Researched and Referred Sites were the sites of the famous usability guru, Jacob Nielsen: www.useit.com and its Japanese translation at www.usability.gr.jp. The purpose of the experiment was to examine the effectiveness of the proposed hints exposure. Our B(Bear) system (Fig.2) has been compared to another well-known R (Roboword) system (Fig.3).

The main difference between these two systems was that R system exposed dictionary-based hints on the word level, and our B system exposed authentic hints based on the parallel on-line texts.

To avoid subjective judgments, half of the subjects firstly operated R system first, then B system. The other group operated B system first. The flow of the experiment was as following:

1. Filling in the fact sheet.
   All subjects were asked to fill in their personal information, English and computer proficiencies etc.

2. Instruction
   All subjects had been instructed on how to operate both the B and R systems.

3. Using B and R systems
   All subjects were asked to freely operate B and R systems. The order of using B and R systems has been random. The informants were informed about the Questionnaire they would have to fill out after the experiment.

4. Filling in the Questionnaire
   The subjects were asked to rate the hints exposure and operation of the systems by 11 criteria on a 5-point scale [Fig. 4]. Subjects were also asked to comment on the systems.

5. Results

The data gained from the questionnaire (Fig.4) was analyzed by a two-tailed t-test. We choose a null hypothesis that these systems did not have any difference in supporting language acquisition. We found that the proposed B system was better than traditional R for increasing:

- Text comprehension (T(9)= 6.12, p<.01)
- Reading Speed (T(9)=3.24, p<.05)
- New Phrase Acquisition (T(9)=2.84, p<.05)
- Discourse Structure Acquisition (T(9)= 4.24, p<.01)

But the traditional R system was better than proposed B system for new words acquisition (T(9)=5.40,p<0.01), although it seems that this rating of the B system strongly depend on the level of the English proficiency of the subject, i.e. High proficiency subjects tended to evaluate the B system higher than those with intermediate proficiency.

By combining the features of both systems we could get better results and better support learners who use different strategies in their language acquisition.
Questionnaire

System:
1. Improves comprehension of the text.
2. Speeds up reading.
3. Supports new words acquisition.
4. Supports new phrases, idioms acquisition.
5. Helps understand in what context new word, phrase should be used.
6. Glosses are adequate.
7. Glosses is suitable in language acquisition.
8. Is complete.
9. Is suitable in language acquisition.
10. Is easy in manipulation.
11. Is interesting.

Average Rating per Question by System

Fig. 4 Average Rating per Question by System

6. Discussion

The overall rating of the B system was higher than R system. In text comprehension, reading speed, phrase acquisition, and acquisition of the discourse structure our B system was better than traditional R system. One of the subjects said:
"Through manipulation of B system the user can grasp a way the natural English is written. I can understand better in what context this word should be appropriately used".

A trend became evident where subjects with high language proficiency tend to rate our system higher than others. But overall rating of the traditional R system was better for word acquisition. Some of the informants also commented about the drawbacks in interface design: some didn’t like the bear agent, others were displeased that the hints’ pop-up overlapped on the original text. We have to seriously tweak our system to remedy these concerns. Many subjects also mentioned that they wanted to use the two systems simultaneously.

7. Conclusions and Future Work

We compared our proposed system with an existing system by conducting an experiment which compared both systems’ effectiveness in phrase acquisition, discourse-structure acquisition and text comprehension. The experiment exposed the drawbacks of our proposed system involved with poor interface design. We conclude that proposed system could be used in tandem with existing systems, enriching the learning strategies available for learners.
In the future, we would like to improve the interface of the system, as well as conduct experiments with combined system, which would allow use of two strategies, Contextual Deduction and Dictionary Look-up, at the same time.

References