# Divergent learning support tool for English learners using thesaurus visualisation

Chie Shimodaira

School of Knowledge Science,
Japan Advanced Institute of Science and Technology
February 2006

**Keywords:** divergent learning, thesaurus visualisation, learning support tool

Language learning with the use of computers has been gaining greater attention due to the increasing demand for English learning as a foreign language. Computer assisted language learning (CALL) using multimedia, automatic language translation, and translation supporting tools which made with free use of latest natural language processing techniques which are some of such examples. Moreover, various types of teaching materials, computer software, and electronic dictionaries have been developed and widely available at shops.

When evaluated in terms of learning efficiency, i.e. contribution to improve user's skills, some of those systems are not very useful. For instance, automatic language translator would be of little help for learners to improve English composition.

Although there have been developed a number of computer assisted learning systems, it is interesting to see the fact that English dictionaries and thesaurus dictionaries are still widely used and maybe the most popular.

When we compose documents in English using dictionaries, we try to choose adequate words from numbers of possible candidates and examples to reflect the meaning that we want

of trial and errors as it involves a number of back tracking. One of the great benefits with this process is that we can learn not only the correct target sentence in English but also other words and expressions intentionally or unintentionally in the English understanding process. Because of this, the process might be called "convergent learning".

It seems that existing language learning systems have been developed to provide the users with right information on target sentences ignoring other additional information as noises, which might have been useful for learners to improve their skills.

Dr Mochizuki reported his empirical findings through his experience in teaching English:

- Rich vocabulary can not be acquired without consulting dictionaries
- Teaching words using its translation does not help a lot
- Words should be learnt with its contexts.

He also remarked that it would be not until the learner has learnt the pronunciation, spelling, meaning, concept, associated words, grammar, collocation, frequencies and so on that he/she really understands the word.

Designers of language learning support tools should underline the importance of the above issues.

We at first hypothesise that learners improve their language skills through the activity where they try to narrow down possible candidates by themselves to find adequate expressions by making use of various types of sources available. Such activity is called "convergent learning".

Based on the hypothesis, we predict that learning support tools which provide users with not only the target word but also other various types of information which is related or similar to the target word would be efficient to support convergent learning of learners. We call this type of support tool "divergent learning support tool".

The present study aims to develop a prototype software tool for supporting learners of English composition by such a divergent manner without loosing the merits of paper dictionaries.

Typical features of the support tool developed in this research are as follows:

- Visualise a thesaurus, which we call "thesaurus diagram", by mean of magnetic spring model in such a way that synonyms of more than one word, and their meanings and examples are graphically shown simultaneously.
- Visualise collocations in the thesaurus diagram to let the user notice the relationships between the words displayed in the screen.
- Show examples and the number of hits using the web search engine "Google".

- Provide the user with a clipboard in which users can cut-and-paste and print the texts found in the thesaurus diagram.
- Record all the interactions with users for future analysis and improvement of the tool.

Evaluation of basic performance shows that the response time of the tool is reasonable as far as the number of user specified words is small, and the memory requirement is reasonable. Subjective experiments show that users support the idea of the tool and evaluate it higher than other competitive tools.