Incidental Vocabulary Learning Supplemented with On-line Reading Activity in Hypertext Environment

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Abstract
This study was carried out to compare Iranian college students’ rate of incidental vocabulary learning when reading texts for different purposes (specific vs. general) and in different conditions (marked vs. unmarked) using Computer-Assisted Language Learning (CALL). The hypertext software programme which was used in this study is characterized with prominent capabilities such as presenting the on-line texts, highlighting special words, accessing the various types of lexical information (e.g. dictionary definitions, concordancing examples, pronunciation, etc.). The participants were 60 freshmen non-English major students who were selected through administering a sample test of University Entrance Exam and initially divided into two main groups: general vs. specific reading task groups and they were asked to read two texts, one in marked condition and the other in unmarked condition. The data were gathered from the following sources: a) a pretest b) immediate vocabulary test. The gathered data were analyzed through using 2 independent two-way ANOVAs. The results revealed that highlighting hyperlinks increased students’ rate of incidental vocabulary learning. Moreover, with regard to the type of reading task, the results suggested that a content-oriented (specific) reading task increased significantly the rate of incidental vocabulary learning. The results of similar study would be more generalizable if the research lasts for a longer period of time or covers wider type of texts and subjects.

Key words: vocabulary, hypertext, CALL, Iran

† Acknowledgment
Nil
1. Introduction

The growing developments of the new computer systems as well as the great advances in programmed instruction have paved the way for the wide application of computer-Assisted language learning (CALL) activities and courseware in the field of second/foreign language learning and teaching. Among these technologies, hypertexts with their unique features such as accessibility, associative quality, intuitiveness, and nonsequential framework have the potential to allow users to browse information based on their “personal relevance, interest, curiosity, experience, information needs and task demands.” (McGuire, 1996:253)

Some researchers like Dillon (1992) and Frenckner (1990) have devoted their time and effort to the investigation of the ways through which the content of hypertexts can be improved and enriched (DeRidder, 2002). But there is far too little research in exploring the influence of the mode of presentation of the texts on different aspects of language learning (e.g. vocabulary acquisition, reading comprehension, writing skill, etc.). Perhaps this is somehow related to the great focus on the ‘content’ of hypertext (What should appear) rather than ‘on-screen features’ (How they should appear) which are mistakenly considered to be autonomous issues unrelated to the language learning or reading process.

To bridge the above gap, this study was carried out to explore the effects of marking hyperlinks (as on-screen feature) as well as the reading task (as unavoidable accompanying influential variable) on students’ incidental vocabulary learning.

1.1 Literature Review

Hypertext system as rich learning environment

Recent insights into the nature of media texts have attracted the attention of many scholars to hypertext system as “a database that has active cross-references and allows the reader to jump to other parts of the database as desired.” (Schneiderman & Kearsly, 1989: 3 cited in Ayersman & Minden, 1995; Chen, Fan & Macredie, 2006)

In general, every hypertext system, as Ramarapu (1996: 185-186) mentions, has three important characteristics:

- "Discrete Information Units”: every concept or piece of information is densed within a unit. Several units can be combined together in order to convey a complex idea.
- “Power of Linking”: within the broad framework of the knowledge database, there are several units, which are connected together through some links. These links enable users to jump from one unit to another one and consequently, make “associations” among
different pieces of knowledge.

- “Network Branching Structure”: the network linking structure of hypertext system provides the possibility of accessing any unit of information whenever and wherever is necessary.

This unique structure of hypertext distinguishes it from the popular textbooks. Koshy, Gramopadhye, Kennedy and Ramu (1996) mention the unique properties of hypertext by referring to its potential to allow users to browse every piece of information, skip the sections that they know and focus more on the unknown parts, and finally structure and organize gathered information as it is more meaningful and memorable for them. Linking new information to the previously known one is considered to be another advantage of hypertext.

And more importantly the role of both instructor and student changes during pedagogical utilization of hypertext technology. When knowledge is presented through hypertext, the role of instructor changes from a mere lecturer to a coach by transferring part of his power and authority to students (Harris et al., 1998).

On the contrary, studies by Gordon et al. (1993) and Canter et al. (1983) point to the shortcomings of hypertext through reminding the fact that users sometimes become confused because of the size and non-linear links of hypertext documents (Koshy et al., 1996) or get lost among hypertext pages (Henry, 1995).

Based on Morariu’s (1988) view, some users can not decide where, when, and what units of information should be searched in order to help them get the whole concept. This lack of “learner control” may be troublesome in two ways; either he may lose important ideas or be overloaded with misleading and irrelevant information. (Henry, 1995)

Finally, “cognitive overload” is another problem that may arise in cases where learners overwhelm with information due to the vastness of information in hypertext system. (Jonassen, 1989 cited in Henry, 1995: 482)

1.1.2 The effect of reading purpose on incidental vocabulary learning

Reading is considered to be one of the valuable sources of incidental vocabulary learning (Krashen, 1989; Moulton, 1966; Sternberg, 1987; Twaddle, 1980; cited in Swanborn & Glopper, 2002).

Several studies have been carried out to exploring the different variables which affect the amount of incidental vocabulary learning while reading. Among these variables, factors such as reader’s age, reading skill, text and word features (Swanborn & De Glopper, 1999), topic familiarity, vocabulary knowledge, relative familiarity with concepts represented through unfamiliar words (Diakidoy, 1993; Durkin,
1990; Sternberg, 1987) have been more attended to (Swanborn & De Glopper, 2002).

However, there has remained one influential element that has been apparently ignored by many educational specialists. Reading purpose or “the goal that the reader has in mind when starting to read” (Swanborn & De Gloper, 2002: 96) has been found to have a crucial role in determining the amount of incidental vocabulary learning while reading.

As Pigada and Schmitt (2006) emphasizes, the purpose of reading a text (e.g. reading for pleasure or reading for information) is influential in selecting the way in which it is read (e.g. extensive reading vs. intensive reading). Therefore, the nature of the reading tasks may affect learners’ willingness to consult dictionary definitions whose subsequent effect may be reflected in their level of text comprehension and/or incidental vocabulary learning.

On the contrary, in a study which produced counter evidences to the above view, Swanborn and De Glopper (1999) found no significant effect of reading purpose on incidental vocabulary learning. This unexpected result was to some extent related to the type of instructions given before starting reading the texts. To clarify this point, it should be noted that pre-reading instructions mainly focus on the descriptions of the purpose and the type of reading activity with no implicit mention of the importance of vocabulary learning. “… one would expect readers who are directed to vocabulary to demonstrate greater gains in vocabulary knowledge than students who have another goal in mind.” (Swanborn & De Glopper, 2002: 98)

Related to the above line of discussion and based on the theoretical foundations of cognitive psychology, Craik and Lockhart (1972) and Eysenck (1982) claim that the deeper one processes a text, the longer he will retain information. (Swanborn & De Glopper, 2002)

In summary, within the framework of incidental vocabulary learning, reading purpose should be taken into consideration as an influential variable that may decrease or increase the rate of lexical development during reading tasks.

1.1.3 Incidental vocabulary learning supplemented with on-line reading activity in hypertext environment

The proponents of “interactionist theory” believe that input should turn into intake-i.e. input that has been comprehended both syntactically and semantically- in order to be acquired.

Based on Schmidt’s (1990) view, “noticing” is a necessary element in the process of changing input to intake. In other words, input turns into intake only when it is noticed. During an interaction, learners are provoked to notice linguistic forms more than any other time in
order to comprehend them both semantically and
syntactically and consequently be able to keep
the interaction.

Noticing can be increased, as Sherwood
Smith (1993) states, through “input enhancement
condition.” Input enhancement condition refers
to condition in which instructor tries to direct
learner’s attention to target learning goals
to condition in which instructor tries to direct
learner’s attention to target learning goals
through commonly highlighting specific target
points. (Hegelheinner & Chappelle, 2000)

As well as noticing requirement, “modified
input” -supplementary annotations or glosses-
play a crucial role in the process of changing
input to intake. (Hegelheinner & Chappelle,
2000)

The fact is that findings about the
effectiveness of glosses and annotations are not
always consistent. Based on Johnson’s (1982)
and Pak’s (1986) views, consulting annotations
does not increase learner’s comprehension.
Besides, in a study conducted by Jacobs, Dufon,
and Hong (1994), any significant increase in the
recall of information acquired through reading a
text was not observed. (Lomicka, 1998)

In addition, Hulstijn (1992) also concluded
that retention of vocabulary through inferring is
longer and better than those acquired through
glossing. The reason underlying this conclusion
is what has been referred to in cognitive
psychology as “deep processing” which is less
present in glossing.

On the contrary, many educators firmly
insist on using glosses. They claim that glosses
not only facilitate comprehension of the text, but
also have a positive effect on vocabulary
learning (Chun & Plass, 1996, 1997; Lyman-
Hager & Davis, 1996; Lyman-Hager et al., 1993;

On the whole, noticing unknown
information and receiving modified input can
increase the chances for language acquisition and
also seems to be a promising line of investigation
to be implemented through CALL researches.

2. Methodology

2.1 Research hypotheses

As it was mentioned before, this study
investigated the effect of marking hyperlinks
(visible vs. invisible) and reading tasks on the
amount of vocabulary pickup, attained
accidentally during reading passages presented
through a specially designed hypertext program.
The hypotheses, that the study sought to test, are
stated as follows:

HO1: There is no relationship between marking
hyperlinks (making them visible or invisible) and
incidental vocabulary learning.

HO2: There is no relationship between the
reading task (general vs. specific) and incidental
vocabulary learning.
2.2 Subjects

At the beginning, 90 students took part in the study. In order to select highly homogeneous students with respect to their level of vocabulary knowledge and text comprehension, a sample test of University Entrance Exam (1382) was adopted and performed and finally 60 of them were left for data analysis. The target population was all non-English major students who had enrolled in a general English course for Academic Purposes. Moreover, all subjects (both male and female) were foreign language learners of English whose mother tongue was Persian. None of them had participated in any previous experiment of this kind. In addition, all of them were familiar with the computer environment and knew how to work with the mouse.

2.3 Materials

2.3.1 Reading passages

The texts used for the purpose of this study were primarily checked to be of an appropriate level of lexical difficulty in order to allow readers to get the general ideas and simultaneously encourage them to consult the provided annotations in the case of encountering with critical unknown words to reach a more comprehensive understanding of the texts. Furthermore one of the factors that was taken into consideration for text selection was the length of the texts. In fact it was important that the length of the texts fit the computer screen size, so that the users were able to see the whole text on one page on their computer screens without scrolling up and down.

It was also thought necessary to ensure that texts were of fairly general interest and learners had relatively a prior knowledge about the topics of the selected texts. To this aim, topic familiarity was checked by indirect questions and was confirmed later by the students’ self-reports after the experiment. Regarding this, the learners’ schematic knowledge bridged the gap in their word knowledge, since there were some critical unknown words, which was supposed to block the reading process of some learners. In this way, learners were able to get more or less a general understanding of the content of the texts, but as far as some of the readers tended to obtain a fuller understanding of the texts, they were provoked to consult the supplementary annotations.

Considering the above restrictions and criteria, two informative texts were finally selected. They were about 160 words in length. Concerning their topics, the first text was about the strategies of improving memory; the second one dealt with a good food diet and the proper ways of preparing food.
2.3.2 Target Words

Each text contained at least 10 words, which were unknown to all participants. And this was verified through a pretest. A list containing 30 words (selected from the content of the two texts) along with some distracters (20 words selected from the learner’s regular textbook) were given to students as part of their regular classwork and they were asked to write the meaning of the given words they knew in English or Persian and circle the words whose meaning they did not know. Out of this word list, 10 target words were finally selected in each text which were most frequently marked as being unknown. These 20 words were annotated and marked for the visible links group. The same words, although annotated, were not marked for the invisible links group.

2.4 Procedure

On the whole, the experimental procedure followed four stages.

1-Selection stage: to select highly homogeneous students with respect to their level of vocabulary knowledge and text comprehension, a sample test of University Entrance Exam (1382) was adopted and performed among 90 freshmen undergraduate college students.

2-Pretest: the pretest was conducted in paper and pencil form as part of the class regular quizzes during a regularly scheduled class time. The pretest allowed the researcher to select 20 target words, which were unlikely to be known to the participants.

3-Tutorial stage (software use): the tutorial stage began four weeks after administering the pretest. This stage consisted of 3 sessions; each lasted for approximately 1 hour. In the first session, each student was asked to read one of the two texts in one of the two conditions based on the predetermined schedule. Students were informed that in the case of encountering unfamiliar words during the Reading process, they could use the provided opportunity of consulting annotations and the possibility of selecting option(s) which best clarify the meaning of unknown words. The provided options included the sound feature, which allowed the users to hear the entered words, offered the opportunity of reinforcing the retention of the new words. At the same site, the concordancing feature presented learners with multiple sentence contexts located by the concordancer. While reading the concordancing examples, learners provoked to guess the meaning of the concordanced word, hold the hypothesis in memory, and confirm or reject it through consulting an on-line dictionary located at the same site. For the visible links group, 10 target words were marked with an unobtrusive symbol ((*) *)), while in the invisible links group,
the 10 target words were the same as the other words in the text.

4-Immediate posttest: After having completed the tutorial stage, computers were shut down and a simple math problem was raised in order to empty students’ short-term memory through directing their attention to another cognitive task. In this stage, subjects took an immediate vocabulary test on paper and pencil.

2.5 Data analysis

To test research null-hypotheses, two-way ANOVAs was conducted using the Statistical Package for Social Sciences (SPSS) with a significant level of 95% to explore the effect of marking hyperlinks and reading tasks on incidental vocabulary learning, having a glance at the interrelationship between the two independent variables too.

3. Results and Discussions

With regard to the first Hypothesis and to measure the degree of difference between the mean of the scores in marked condition (N=60) and the mean of scores in unmarked condition (N=60), the Analysis of Variances (ANOVA) was used and F-ratio was calculated. So far as the word learning is concerned, the results of the data analysis clarifies that marking has significant effect on the amount of incidental word learning. Looking at the F value (F (1, 58) =79.48, P< .05), it is apparent that there is significant difference in subjects’ rate of retention of words acquired incidentally in two different conditions-marked vs. unmarked one (P< .05) and hence the first null-hypothesis was rejected.

In order to test the second Hypothesis, Analysis of variance (ANOVA) was performed. Analysis of Variance comparing mean retention scores between the two independent groups (N=30) – one was assigned to a general reading task and the other one to a specific one- shows that the answer to the second question is affirmative. In other words, the P value is less than 0.05 and therefore the difference between the retention scores is significant (F (1, 58) =84.13, P< .05).The second hypothesis was, therefore, rejected too.

It should be noted that consulting a dictionary and/or concordancer has been shown to have a positive effect on incidental vocabulary learning (Chun & Plass, 1996). Yet some learners do not like to use a dictionary when encountering unknown words (Hulstijn, 1993). Lack of time, disturbing the flow of reading, and most importantly flicking through dictionary pages are some reasons, which mostly prevent learners from using a dictionary. A computer-assisted vocabulary learning software equipped with an electronic dictionary, concordancer, etc. may solve this problem to the extent that the ease and
speed of using may encourage the learner to look up unfamiliar words. This in turn, will not only contribute to more fluent reading, but will also increase the chance of acquiring the looked up words.

However, the aim of this study was to go beyond mere demonstration of the acquisition. The questions, which were raised, were whether factors such as the reading tasks or word saliency might affect the retention of words and if so, in what ways. To this effect, students’ scores in vocabulary tests were compared together with respect to the following factors:

- Marked vs. unmarked hyperlinks
- General vs. specific reading tasks

Concerning the first factor, this study indicated that subjects has higher rates of L2 vocabulary acquisition in marked condition in comparison to the unmarked one, both in immediate and delayed vocabulary recall tests. The subjects mean score in vocabulary test in marked condition and in unmarked condition were 8.03 and 5.57 words respectively.

The results concerning the rate of vocabulary acquisition are not surprising. According to Lomicka (1998) study, when learners pay more attention to the link between form and meaning, they can recall foreign words better. Furthermore, Robinson’s (1995), and Schmidt’s (1990) studies which are based on the noticing hypothesis provide evidence on the positive effect of conscious awareness to the connection between form and meaning which can in turn lead to better retention of unfamiliar words. In the case of this study, the increased attention was attained through marking the target words by an external pointer (**)). The saliency directed students’ conscious awareness towards words, which were highlighted by an overt external pointer (**). This, in turn, prompted them to click on the marked words and to consult with the provided dictionary definitions and/or concordancing examples in order to find the meaning of the clicked words. In addition, the increased dictionary look-ups included a more frequent use of the Hear button, which provided auditory reinforcement that contributed to the improvement of the rate of vocabulary pick-up. Whereas, in the unmarked condition, as it was induced from the subjects’ reports and interviews concerning the used vocabulary learning strategies during reading texts, learners made great use of context for guessing the meaning of unfamiliar words.

In short, the findings of the present study supported the ‘noticing hypothesis’ and emphasized on the positive effect of electronic glosses for vocabulary learning.

As many specialists may approve, reading is one of the prominent sources of vocabulary learning. However, the amount of vocabulary acquisition during the process of reading a text depends partially on the nature of the reading tasks subjects are assigned to (DeRidder, 2002).
With regard to the above point of view, DeRidder (2002) found that the general reading task led to significantly more incidental vocabulary learning. In the current experiment, on the contrary, subjects in the specific reading task group scored significantly higher than subjects in general reading task group.

A possible justification for the above finding can be traced in students’ specific orientation towards text comprehension in the specific reading task group. This, in turn, led to the increasing need for comprehending a greater number of words to understand the content of the texts precisely. Therefore, in the case of encountering critical unknown words, learners were provoked to search them through hypertext links. This search-and-find task and conscious focus on the link between the form and meaning of the unknown words led seemingly to the higher rates of vocabulary retention.

Concerning the contradiction between the findings of the present study and DeRidder’s, it can be suggested that changes in some factors such as the difference in the population characteristics (number, level of language proficiency, …), type of the texts length, topic, …), type of final evaluations, etc. may have been led to such a contradiction.

To sum up, the findings of the current research strengthened the idea of the importance of the external pointers as more overt guidance in the process of learning. Afterall, the salience of the marked words not only did not distract the readers’ attention, but also led to an increase in the rate of incidental vocabulary learning.

4. Conclusion

When a person encounters a challenging task, s/he takes benefit of different strategies and resources to solve the problems. Languages learning in general and vocabulary acquisition in particular are such challenging tasks. In order to empower learners to come up with these demanding tasks, a learning environment that encourages independent learning and motivates learners towards self-discovery should be grounded. As Jonassen (2000) remarks “hypertext permits learners to individualize the knowledge acquisition process. In fact, hypertext allows them to interact with new information in the way that is most meaningful to them.” (P.278) providing easy access to electronic texts, hypertext systems can help learners to improve their reading abilities and expand their vocabulary knowledge beyond the end of the course. Moreover, attracting learners’ attention towards a complicated world of nodes-and-links, they have the potential to engage learners in an active process of search-and-find and constructing knowledge. Yet, there are some factors, which influence the effectiveness of hypertexts used for the purpose of language learning, for example vocabulary leaning. Since
this branch of study is new, there have existed little studies devoted to investigation of the factors, which may affect the process of language learning in such environments.

One of the main objectives of the current study was to find out whether there was a relationship between marking hyperlinks and the amount of incidental vocabulary acquisition. The results indicated that when foreign language learners read a text in marked condition where some words were more salient than others, they were more willing to consult the supplementary annotations (dictionary definitions, concordancing examples, etc.). Hence, this deeper processing of information led to the increase in the rate of the vocabulary learnt incidentally. On the contrary, when learners read a text in a condition with invisible links, their willingness for consulting supplementary annotations seemed to be less excessive. In other words, learners relied more on the context derivation of meanings, which followed less concentration on the links between forms and meanings and therefore, led to less retention of word meanings.

The second main objective of the current experiment was exploring the relationship between the type of the reading tasks (general vs. specific) and the amount of incidental vocabulary acquisition. The first finding related to the above issue revealed that the reading tasks did affect the subjects’ vocabulary learning: a content-oriented reading task (specific reading task) appeared to increase the readers’ motivation for understanding the unknown words to get a fuller understanding of the texts. The reason underlying this increased motivation may lay in readers’ willingness to decode the content of the texts precisely without even ignoring one critical word. On the contrary, readers who aimed to get the general ideas of the texts showed less willingness to search each unknown word through hypertext links due to the fact that getting the whole idea, not its details, was their main concern. This aim could be reached through context derivation of word meaning even though the exact meaning of the unknown word was not found. Consequently, due to the less deep focus on the link between form and meaning of the unknown words, subjects in general reading task group retained less words in comparison to their fellows in specific reading task group.

On the whole, the findings of the current experiment showed to be promising in opening new gates of research for widespread use of CALL technologies in educational settings especially foreign language learning classrooms.
5. References


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