

Summary  
of  
Doctoral (Ph.D.) Thesis

**THE EFFECTS OF FORM- AND MEANING-FOCUSED  
HYPERTEXTUAL INPUT MODIFICATION ON L2 VOCABULARY  
ACQUISITION AND RETENTION**

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## 1. Purpose of the study

The present research investigates how hypertext computer applications influence the effectiveness of second language vocabulary acquisition. Consequently, it has a double focus with the following main aims:

**Aim 1:** It aims to find out whether interactionally modified input made salient through computer-based hypertext annotations will yield better L2 vocabulary acquisition and retention results among intermediate EFL learners than the application of a traditional paper-based text with a paired associates vocabulary list to assist learners. A sub-problem belonging to this aim is to find out how the application of form-focused and meaning-focused hypertext annotations affects shorter- and longer-term retention of the target vocabulary, i. e. to shed light on whether the application of form- or meaning-focused gloss contents will give more support to intermediate learners of English involved in the experiment. This issue promises to be particularly interesting as previous lexical memory research (see. Singleton, 1999) found that in earlier stages of language acquisition learners rely more on formal features in the L1 mental lexicon, while in later, more advanced stages they rely predominantly on semantic features of the lexical units to be acquired.

**Aim 2:** The second main aim of this study is to determine whether there is a difference between the achievement (both shorter-term acquisition and longer-term retention) of the aforementioned intermediate students when they acquire new L2 lexical units incidentally and intentionally. A sub-problem of this issue is to examine how the potential impact of incidental or intentional learning condition on the acquisition and retention of L2 vocabulary is modified through the application of either form- or meaning focused hypertext annotations.

Recent vocabulary learning research has been based on cognitive interactionist theories of psycholinguistics and SLA, which emphasize the importance of input, interaction and output in the second language acquisition process (see e.g. Gass, 1988, Schmidt, 1990). The first stage in this process is noticing input, which presupposes the allocation of attention to input, as unattended pieces of information are likely to go unnoticed, which in turn blocks the way to further stages of the language acquisition process. It has been suggested therefore that learners' attention should be directed to input by making it salient, which can be achieved through input enhancement and interactional modifications, i.e. the negotiating of input (Long, 1983; 1996).

The interactive nature of computers, together with the potential of new hypermedia-platformed information technologies allow the learner to engage in interaction with input made salient through consulting hypermedia annotations of various contents. The computer becomes a metaphorical participant of communication by making the potentially new lexical items salient through the use of various highlighting techniques (underlining, different colour) of hypertext technology, By clicking on these highlighted words the learner can get into interaction with the computer, and, consequently, get help using the rich information content of the glosses emerging as a result of the click (cf. Chapelle, 1998).

The majority of studies in this area have investigated the potential advantage of multimodal presentation of the material in the computerized annotations comparing the effects of text, graphics, video, and sound (e.g. Brett, 1997, 1998; Chun & Plass, 1996; Al-Seghayer, 2001; Chanier & Shelva, 1998, etc.). There are also studies examining the effect of using annotations on reading comprehension as well as on

incidental and intentional vocabulary learning conditions (e. g. Hulstijn, Hollander, & Greidanus, 1996; Lomicka, 1998; De La Fuente, 2002; Laufer & Hill, 2000; DeRidder, 2002; Harrington & Park, 1997; Rott & Williams, 2003; Son, 1998; Liu & Reed; 1995; Groot, 2000; Koren, 1999). The above studies have generally yielded positive results concerning the usefulness of computerized hypertext annotations in second language vocabulary acquisition. However, they also often draw the conclusion that clearly more empirical evidence is needed to prove the superiority of computer-based hypertext applications over the traditional paper-based second language vocabulary acquisition. Besides encouraging further research into multimedia applications, they call for the investigation of the effect of a single presentation modality (e.g. text only), and suggest studying how hyperglosses containing associations based on the formal and semantic features of words (which in part imitates the structure of the mental lexicon) can influence the shorter- and longer-term effectiveness of second language vocabulary acquisition.

Even though most of the earlier investigations in this field of research have been consulted and taken into consideration, in a strict sense not one of them can be considered as a base-line study for the present work. The design of the current study in part draws on Hulstijn, Hollander, and Greidanus' (1996); Harrington & Park's (1997), Lomicka (1998); Koren's (1999); and Laufer & Hill's (2000) works, however, strictly speaking none of the above can be considered as a base-line study for the present experiment. Rather than exactly replicating any of the rather diverse studies, the current work intends to amalgamate some of their intriguing and promising features into a complex investigation in the Hungarian context. The current study is predominantly text-based, as the author was interested in the effect of various linguistic tools on the success of the acquisition and retention of L2 lexical units, rather than in the influence of multimedia elements that the majority of the previous studies dealt with. Following the cognitive interactionist framework of second language acquisition research (Gass, 1988), the present study focuses exclusively on input, even though the researcher is fully aware of the significance of output and pushed output (Swain, 1985) formulated as a reaction to the corrective feedback provided in the process of input negotiation. The study aims to measure only receptive knowledge gain (i. e. recognition) of the target vocabulary.

Besides the above mentioned main aims of the investigation, students' hypertext-based vocabulary study strategies as reflected by their requests for input modifications (i.e. ignoring or consulting glosses) and their attitudes towards the use of computerized hypertext glosses in vocabulary acquisition are also examined. The former is studied with the help of a tracking device incorporated in the computer program that can follow up participants' clicking behaviour, while the latter is surveyed with a questionnaire.

## **2 Description of research**

The second chapter of the thesis provides an overview of the theoretical background of the study and presents the relevant research that has been conducted in the field. It discusses psycholinguistic processes in second language acquisition making use of the results of cognitive psychology and second language acquisition research. The chapter includes current theoretical views on the significance of attention and noticing in information processing research, together with the importance of input and interaction in the interactionist framework of second

language acquisition research. It deals with the role of memory processes in lexical acquisition including the most commonly used models of human memory and ways of enhancing memory skills, which is crucial for L2 vocabulary acquisition and retention. This is complemented by describing theories on how lexical information is stored in and retrieved from the second language mental lexicon. Next, theories of vocabulary acquisition are described comprising the definition of knowing a word, outside factors and learner strategies affecting vocabulary acquisition. It is followed by the role of incidental and intentional learning in second language vocabulary acquisition. Another important part of this chapter discusses the potential of hypertext/hypermedia computer technologies in second language learning and in L2 vocabulary learning in particular. A particularly important section here is the description of recent research investigating the impact of input enhancement and modified interaction through the use of electronic hypertext glosses on L2 lexical acquisition. The final part of this chapter summarizes research on the functions of form and meaning in the language learner's mental lexicon and in L2 vocabulary acquisition specifying the role hypertext can play in strengthening form-meaning mappings in the mental lexicon.

## **2.1 Research questions and hypotheses**

The study has a double focus investigating both a) the effect of interactional input modification through form- and meaning-focused computerized hypertext annotations on L2 vocabulary acquisition and retention, and b) the effect of incidental and intentional learning on L2 vocabulary acquisition and retention when using form- and meaning-focused computerized hypertext annotations. The research questions (RQ) of the study are as follows:

### ***Research focus A***

**RQ:** Does interactionally modified input made salient through computer-based hypertext annotations yield better L2 vocabulary acquisition and retention results among intermediate EFL learners than the application of a traditional paper-based text with a bilingual paired-associates vocabulary list to assist learners? The following hypotheses (H) were formulated:

**H0:** Learners exposed to hypertextually-enhanced interactional input modifications in the two experimental groups will attain the same level of L2 vocabulary acquisition and retention as learners subjected to non-negotiated input in traditional paper format in the control group.

**H1:** Subjects exposed to input during negotiated interaction through link-based hypertext presentation will attain higher levels of L2 vocabulary acquisition and retention than learners subjected to non-negotiated input.

**H2:** Participants subjected to meaning-focused hypertext input enhancement will outperform learners exposed to form-focused hypertext enhancement in L2 vocabulary acquisition and retention.

### ***Research focus B***

**RQ:** Is there a difference between the acquisition and long-term retention achievement of the aforementioned intermediate EFL students when they acquire new L2 lexical units incidentally or intentionally? The following hypotheses (H) were formulated:

**H0:** Students learning target vocabulary intentionally will attain the same levels of L2 vocabulary acquisition and retention as students acquiring the same vocabulary incidentally.

**H1:** Students learning target vocabulary intentionally will attain higher levels of L2 vocabulary acquisition and retention than students acquiring the same vocabulary incidentally.

**H2** Although in general better vocabulary acquisition and retention results will be achieved in the intentional learning condition than in the incidental condition, the application of form- and meaning-focused hypertext glosses will decrease this difference. This means that in spite of the superiority of test results in the intentional learning condition over those in the incidental condition in general, it is hypothesized that the difference between the attainment of the subjects in the control group in the intentional condition and that of the subjects in the treatment groups (either form- or meaning-focused) will not be significant.

## **2.2 Research design**

In order to measure the effects of input enhancement and interactional input modification through computer-based hypertext glosses on vocabulary acquisition, a seven-week cross-sectional study was designed using both quantitative and qualitative research methods. Considering the complex nature of the study described above, a mixed research design (cf. Hatch and Lazaraton, 1991) was applied. A between-groups experimental design was used to measure the potential effects of form- and meaning-focused hypertext annotations compared to the application of traditional paper-based printed text format. The achievement and behaviour of students were studied in three different groups (i.e. a group working with form-focused hypertext annotations, another group exposed to meaning-focused hypertext glosses, and a third one working with hard copies of the same text complemented only by a bilingual glossary of the target words). The research had a balanced design with forty subjects in each group studied. To measure the difference in outcome between incidental and intentional vocabulary learning a within-groups repeated-measures design was applied. This means that the same 3 groups involved in the experimental situation described above were studied both in incidental and intentional learning conditions. This was organized by giving these groups two different texts with as similar linguistic characteristics as possible, each text on a separate occasion. Besides studying the potential differences between the form- and meaning-focused enhancement and the no-enhancement conditions, on the first occasion (and with text 1) the effects of incidental learning and on the second occasion (and with text 2) the effects of intentional learning were also measured. In order to measure the effects of the above conditions on the acquisition and retention of L2 lexical units both the between-groups and the within-groups designs were mixed with a repeated-measures testing battery including an immediate post-test right at the end of the study session, and a delayed post-test three weeks later. For a comprehensive description of the experiments see Table 1. below.

Table 1. The comprehensive research design box for the study

	Form-focused Enhancement		Meaning-focused enhancement		Zero enhancement	
	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test
Incidental vocabulary learning	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test
Intentional vocabulary Learning	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test	Immediate post-test	Delayed post-test

Besides the main research design described above, the subjects' study behaviour, as well as their attitudes and beliefs were also investigated using both quantitative and qualitative methods. A questionnaire aimed to shed light on the participants' attitudes to computer-based vocabulary acquisition using hypertext/hypermedia annotations. It included such aspects as the ease of use and the perceived usefulness, effectiveness of such hypertext programs, the perceived importance of interaction with the computer and input salience through highlighting, the best/most useful gloss content types, as well as the strong and weak points of the program they used. The learners were also asked whether they had ever learnt English words incidentally (that is as some kind of a "by-product") while they were trying to track down some specific information of non-linguistic nature on the World Wide Web. In case of affirmative answers they were asked how many of the words learnt in this way they could still remember. In order to make sure that the subjects really consulted the hypertext annotations, and therefore their vocabulary learning achievement could be attributed to the use of hypertext annotations, as well as to follow their learning strategies through their clicking behaviour, a tracking device was attached to the computer program, which followed and logged the subjects moves in the program. The study was conducted over a period of 7 weeks. Data collection took place during regular class time in three different secondary schools of Debrecen. The experiment was composed of three basic stages: 1) a pre-test and a questionnaire 2) a learning and immediate post-test session, and 3) a delayed post-test, which was the exact replica of the immediate post-test and a questionnaire. The learning sessions were computer-based in the form-focused and the meaning-focused experimental groups, whereas the control group got the same texts in traditional paper-based hard copies. The exact schedule of data collection during the experiment can be seen in Table 2.

Table 2. Schedule of data collection during the experiment

Time	Action Taken
Week 1	Self-report pre-test Questionnaire 1
Week 2	Tutorial session 1 – incidental learning condition Immediate post-test 1 (at the end of the study session)
Week 3	Tutorial session 2 – intentional learning condition Immediate post-test 2 (at the end of the study session)
Week 4	Break
Week 5	Break
Week 6	Break
Week 7	Delayed post-tests (the exact replicas of immediate post-tests 1 and 2) Questionnaire 2

Including the 61 people who took part in the preselection and piloting of the texts and target words to be used in the experiment, a total of 200 students and 8 teachers participated in the study. A final pool of 120 students was selected randomly for test result analysis. All the subjects were 14-17 year old secondary school students with an average English learning experience of 5 years. All students had had an average of 300 lessons institutionalized English learning experience. For feasibility reasons they belonged to 10 intact intermediate level EFL classes from 3 different secondary schools. The students of these 10 classes were randomly divided into 3 groups corresponding to 3 experimental conditions (formal input enhancement, semantic input enhancement or control working with no input enhancement). Students' English proficiency level was only a preliminary filter of subject selection, which was followed by a secondary filter of much greater importance, where the final subjects were chosen on the basis of their performance on a self-report vocabulary pre-test. The aim of the pre-test was to make sure that the 13 words per text selected for the experiment would be unknown to all participants.

To try and influence the word acquisition process by means of enhanced and interactive exposure to the formal and semantic features of the selected L2 words, a small-scale hypertext-based computer program was created. The program was uploaded onto the World Wide Web to make it accessible for the subjects in the computer labs of their own schools. As the mixed research design of the study included both a between-group and a within-group repeated-measures component, four versions of the program were prepared: one for the incidental and another for the intentional learning condition, each of which had a form-centered and a meaning-centered version. In all four cases the program functioned basically in the same way, the difference being only in the texts and naturally in the contents of the belonging hypertext annotations. In each text 13 new words highlighted through the use of a different colour were annotated hypertextually, and the rest of the words in the texts were not explained or translated into L1. Students were encouraged to infer the meanings of these words from the contexts provided.

The main characteristic feature of the study was that, while members of the control group were working with traditional printed texts supplemented with English-Hungarian vocabulary lists of the target words, experimental groups were using non-linearly structured texts enriched with hypertext annotations based on associative links. On the basis of former studies (Liu & Reed, 1995; Chun & Plass, 1996; Al-

Seghayer, 2001) it was believed that by using hypertext/hypermedia glosses learners could have easy access to a large amount of relevant textual information, which could speed up the lexical acquisition process, as learners would not have to interrupt the reading and process by spending time on dictionary lookups. Following the principle of constructivism it was hoped that the cognitive scaffolding available in the form of the large amount of relevant information provided in the hyperglosses would potentially enhance the effectiveness of vocabulary acquisition. By supplying a lot of information in connection with the target vocabulary, hypertext glosses provide an opportunity for the learner to activate their relevant formerly acquired knowledge, and to embed the new words into the existing conceptual, formal and semantic mesh of their knowledge base.

While reading the story, students could look up any of the annotated words as many times as they wished within the time limits of the study session. The content of annotations was presented in the bottom 1/3 part of the screen, while the learner could see the given word in its context, which feature was hoped to facilitate both the understanding and the memorization of the word. Form-focused annotations included the main inflectional and derivational morphological characteristics of the word, its phonological transcription, audio-format pronunciation, and main Hungarian equivalents. Conversely, meaning-focused annotations included the English definition of the word, its synonyms, antonyms and other sense relations and expressions or sentences illustrating word use. The Hungarian equivalents of the target words were also included as it was feared that the exclusive use of English definitions might confuse intermediate learners in this group, thus potentially reducing the effectiveness of their vocabulary learning.

The principle purpose of the research was to measure predominantly the potential effect of visually- and interactionally enhanced linguistic features on second language vocabulary acquisition. Therefore the study intentionally focused on the effects of text-only phenomena, and consequently used only hypertext trying to avoid multimedia elements. Nevertheless, it was decided that form-focused annotations would also incorporate an audio component, in which a native speaker pronounced each word on request. The compromise of including the audio component was decided upon, because psycholinguistic research on the L2 mental lexicon (cf. Singleton, 1999) shows that L2 learners in the earlier stages of their studies tend to heavily rely on phonological phenomena. Formal glosses of the software also included the phonological transcriptions of the target words, however, in a recent survey (Sanko, forthcoming) it was found that students did not like relying on such transcriptions only. It was hoped that by making this compromise, i.e. by enabling students to see the phonemic transcriptions of the target words as well as to hear them pronounced, would considerably increase the potential for learning.

In the incidental learning condition participants were not forewarned that they would write a vocabulary test on the words occurring in the (first) text at the end of the lesson, lest they should consciously prepare for it. In stead, they were informed that they would be asked to write a test checking the comprehension of the text. As oppose to this, one week later, in the intentional working condition, students were asked to study the (second) text carefully, and to learn the new lexical items in them, as they would be asked to write a vocabulary test at the end of the lesson. In both experimental conditions, at the end of the study sessions participants wrote banked gap-filling vocabulary tests on the target words (cf. Alderson & Ceresnyes, 2003) exploiting the study text in their original forms. Three weeks after the second study session the 2 immediate post-tests (one used to measure incidental word acquisition,

the other used to gauge the result of intentional learning) were repeated unexpectedly in unchanged forms, so as to measure the potential longer-term retention of the target words. In order to prevent students from consulting the web documents during the three-week rest period, the web sites were removed from the server immediately after the last study session. The teachers of the students involved in the experiment also confirmed that during this three-week period students had not learned any of the target vocabulary institutionally (i.e. either in class or as homework). In this way it could be assured that participants could rely only on their memories gained in the study sessions dedicated to vocabulary acquisition and learning.

After correcting the 240 immediate and the 240 delayed post tests the scores for each student were recorded with the help of an SPSS 8.0 software program and subjected to statistical analysis. The test results were first subjected to a descriptive statistical analysis, and, on realizing that the test results gained did not represent normally distributed data, it was decided that for inferential statistical analysis nonparametric methods would be used. A within-subjects and a between-subjects repeated-measures multivariate analysis of variance (MANOVA) was applied to try and find significant differences in the vocabulary test achievements between the different methods and learning conditions. The Kruskal-Wallis nonparametric test procedure followed by Mann-Whitney U-tests provided analysis of variance for the effects of the three different and independent input types (viz. form-focused, meaning-focused and control), and the Friedman test repeated-measures procedure complemented by the Wilcoxon Signed Rank Test provided analysis of variance for making the same measurement twice with related data, once in incidental and once in intentional learning condition with the same research population. The null hypotheses were tested at a  $p < .05$  level of significance. Potential correlation between the answers to closed questions 1, 5 and 7 and the test results achieved, as well as possible correlations between the answers to the above three questions as given by participants exposed to form-focused or meaning-focused input enhancement, were analyzed using the Spearman Rank Correlation technique. The potential correlation between lookup frequency and the test results achieved after being exposed to the different learning conditions were also analyzed using the Spearman Rank Correlation technique.

### **3. Results**

One of the main research questions of the study (RQ1) was whether interactionally modified input made salient through computer-based hypertext annotations would yield better L2 vocabulary acquisition and retention results among intermediate EFL learners than the application of a traditional paper-based text with a bilingual paired-associates vocabulary list to assist learners? On the basis of the results gained in the study, the null hypothesis claiming that learners exposed to hypertextually-enhanced interactional input modifications in either of the two experimental groups would attain the same level of L2 vocabulary acquisition and retention as learners subjected to non-negotiated input in traditional paper format in the control group could be rejected, as the results of the subjects using some form of hypertextual input enhancement were significantly different from those in the control group using no input enhancement.

Hypothesis 1 (H1), which predicted that learners exposed to input during negotiated interaction through link-based hypertext presentation would attain higher levels of L2 vocabulary acquisition and retention than learners subjected to non-

negotiated input was only partly proved. The results of the current research did not provide satisfactory evidence to confirm this hypothesis. Even though there was a general tendency observable according to which participants using hypertext annotations had better achievements on both immediate and delayed post-tests in incidental and intentional vocabulary learning conditions, this tendency did not reach a statistically significant level in all experimental conditions, therefore it must be considered as conjectural evidence. Participants using form-focused annotations and those using meaning-focused annotations both significantly outperformed subjects using the traditional paper-and-pen bilingual word list technique on the immediate post-test in the intentional learning condition. The same statistically significant ( $p < 0.05$ ) difference, however, was not to be found on the delayed post-tests or in the incidental learning condition. Therefore, in sum, it must be stated that the results of the current research do not confirm the claim formed in hypothesis one. The lack of significant differences on the delayed post-tests between students working with the various forms of input is probably due to the fact that participants had only one single exposure session to the target vocabulary.

Hypothesis 2 (H2), which predicted that learners subjected to meaning-focused input during negotiated interaction would outperform those subjected to form-focused enhancement condition in L2 receptive vocabulary acquisition and retention both under incidental and intentional learning conditions was not confirmed by the results of the study. Contrary to prediction, participants learning with meaning-centered glosses never outperformed significantly those using form-centered annotations. Therefore, even though the tendency in test results shows that the intermediate learners with around 300 lessons of institutionalized English learning experience participating in the study profited more in their vocabulary learning from using semantic annotations, for lack of statistical significance this conclusion also remains only conjectural.

The other main research question (RQ2) investigated whether there was a difference between the acquisition and long-term retention achievement of the aforementioned intermediate EFL students when they acquired new L2 lexical units incidentally or intentionally? The null hypothesis (H0), which predicted that students learning target vocabulary intentionally would attain the same levels of L2 vocabulary acquisition and retention as students acquiring the same vocabulary incidentally, could be distinctly rejected on the basis of the findings of the experiment as participants achieved different results in the two learning conditions.

Hypothesis 1 (H1), which predicted that students learning target vocabulary intentionally would attain higher levels of L2 vocabulary acquisition and retention than students acquiring the same vocabulary incidentally, was confirmed by the results of the study. Nonparametric statistical analysis of the test results unanimously showed that, on the whole, participants learning in the intentional condition significantly outperformed those acquiring words incidentally. This was true both for shorter term acquisition and longer term retention results. The results, which support Hulstijn's (1992), and Hulstijn, Hollander & Greidanus' (1996) findings, suggest that it does matter when students are focused on the task of mastering the new words intentionally. Nonetheless, incidental learning, where learners acquire new lexical units as a "side product" through extensive reading of books, magazines or browsing the World Wide Web, may be a useful alternative to complement the more effective intentional mode of vocabulary learning

Hypothesis 2 (H2) predicting that although intentional vocabulary learning would yield better results than incidental learning, both meaning- and form-focused

enhancement would favourably affect (improve) the immediate post-test (i.e. acquisition) and the delayed post-test (i. e. retention) results of learners under the incidental learning condition was confirmed. As no statistically significant difference was found between the results of the control group in the intentional condition, and those of the experimental groups in the incidental condition, it can be concluded that participants using hypertext input enhancement in the incidental learning condition attained about the same levels of vocabulary acquisition as subjects using no enhancement in the intentional learning condition. This result manifests the beneficial effect of interactional input modification by using elaborative redundancy in the form of hypertext glosses.

After analyzing the test results, in sum it can be stated that the present study did not prove it in a convincing way that through the application of form- and meaning-focused computerized hypertext glosses significantly better results can be achieved in EFL vocabulary acquisition than through the use of traditional printed texts supplemented with bilingual vocabulary lists. Even though participants using hypertext glosses outperformed members of the control group in every experimental condition, statistically significant differences could be spotted only in the case of immediate post-tests, and under the intentional learning condition. In the case of delayed post-tests, measuring longer-term retention of the target vocabulary, the same significant difference could not be established. Similarly, members of the meaning-focused group achieved significantly better test results than those in the control group on the immediate post-test in the intentional vocabulary learning condition, but, contrary to prediction, participants learning with meaning-centered glosses never outperformed significantly those using form-centered annotations. Concerning the other main aim of the study the prediction that students learning target vocabulary intentionally would attain higher levels of L2 vocabulary acquisition and retention than students acquiring the same vocabulary incidentally was confirmed both for acquisition and retention results. The results also manifested the beneficial effect of interactional input modification by using elaborative redundancy in the form of hypertext glosses, as no statistically significant difference was found between the results of the control group in the intentional condition, and those of the experimental groups in the incidental condition. In spite of the relatively large number (120) of randomly selected subjects in the study, the results gained can not be broadly generalized. Despite this fact, and the rather varied test results, the tendencies indicated in the study deserve some more serious consideration.

In some cases the results gained though the questionnaire and the observations of students' study behaviour using a tracking device (both used to achieve secondary aims of the study) proved to be incongruent. When subjects were asked about the usefulness of the different gloss types/contents, it was found that what students said and did was sometimes in contradiction with each other, as the log files recording learner moves during program use reported a different behaviour from that expressed in the questionnaires. For instance, there was a considerable discrepancy between what participants said and did concerning the usefulness of phonemic transcription. More than 70% of the subjects declared that such information type was useful, about 20% of them asserted that it was moderately useful, and only about 5% wrote that it was not useful for vocabulary learning. In contrast, the log files manifested an extremely rare use of this information type throughout the experiment. The answers to the questionnaire indicated that another favourite information type used by the participants was the Hungarian equivalents of the target words. More than ninety-eight percent of the subjects expressed that providing the Hungarian equivalent was

very useful, which information was very much in accordance with their gloss consulting behaviour as measured by the tracker device. This suggests that the intermediate EFL students in the study with an average five years of language learning experience still depended heavily on their mother tongue. Students' other most favourite gloss type was the audio pronunciation. On the basis of the data recorded by the tracking device, it can be stated that students preferred using cognitively shallow study strategies that required the least possible effort on their part.

Although participants in general thought favourably of the hypertext technology they were using for the purposes of vocabulary learning, no correlation was found between participants' attitudes and perceptions with their achievements as measured by the tests. Similarly, no correlation was found between their answers (only questions 1, 5, and 7 were analysed) when comparing those given by students in the group using form-focused or meaning-focused input enhancement. This suggests that even though students may be aware of the benefits of certain technologies and methodologies, this may not necessarily be reflected in their performance. Similarly, neither positive nor negative significant correlation was found between the frequency of consulting hypertext glosses, which, considering the good test results when using such hypertext input enhancement, might suggest that it is rather the quality than the quantity of consulting glosses that matters and brings about changes. The issue could be further clarified e. g. with think-aloud protocols, or by interviewing students right after using such technology in L2 vocabulary learning.

#### **4. Suggestions for further research**

For feasibility reasons the size of this study is rather limited. Nevertheless, some of the issues emerged in this study would deserve further attention and more detailed investigation. In the current study investigating the potential facilitative effects of computerized hypertext applications on incidental and intentional second language vocabulary acquisition and retention only 120 students participated, who met the target words only once and in one single context. The same study should be repeated with a larger number of subjects selected from a much wider population, which could result in more power to generalize in detecting the impact of hypertext/hypermedia glosses on vocabulary learning. The experiment should be repeated trying out the same methods with students representing other levels of linguistic proficiency. As was mentioned earlier, more emphasis should be laid on measuring long-term retention some weeks after the study session, which would require exposure to the target words on several occasions, and in different contexts. It would be interesting to measure the possible effect of hypertext computer technologies on L2 vocabulary learning after doing such recycling work. Besides, a language proficiency pretest would allow for a more finely-tuned analysis of the results. Assessment of the receptive learning outcome was measured only with banked cloze tests which concentrated more on meaning than on form.. By using other assessment techniques that combine the elicitation of meaning as well as formal features of vocabulary knowledge, a more complex picture could be provided reflecting various aspects of vocabulary knowledge.

Hypertext programs, although accommodating a range of learning styles, are still rather rigid by nature with a fixed material content, fixed links, and additional information available in the glosses. As not all students are typical, their individual characteristics, learning style preferences, and many more individual features and circumstances should be taken into account when designing the structure of

hypertextual language learning environments. Further research is needed to design such systems and investigate their effect on vocabulary learning and second language learning in general. By making hypertext/hypermedia-based language learning environments more adaptive, the learning process could be further individualised, allowing the L2 student to follow a learning path that suits their short- and long-term needs, interests or mood. A flexible model is offered by Eklund (1995), who proposes adaptive hypertext. Such hypertext system would continually monitor the language learner's moves through their clicking behaviour, map their learning history, remember what words have been consulted, how many times, what information type or help facility has been asked for, and gently assist and guide them along the program (which can also be a relatively open system as large as the Internet) on the basis of the detected, thus potentially providing considerably higher language learning effectiveness

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## **6. The author's related publications, unpublished conference papers, dissertations**

### **6.1 Publications related to the topic area of the present study**

2005. Perceptions and Reality: Intermediate EFL Students' Vocabulary Learning Strategies in a Computer-Supported Hypertext Environment. In J. Kiss-Gulyás, and I. Banka (eds.). *Studies in English Language Learning and Teaching*. Institute of English and American Studies, University of Debrecen. (pp. 69-86).
- 2001 Language learning through virtual immersion into the WWW global village. (A need for a new kind of learner training and its implications for teacher training) In Riordan, T. and Hollósy, B, (Eds.) *Studies in Linguistics*. V. 158-175. Debrecen: The Institute of English and American Studies. University of Debrecen.
1997. Problems and possibilities of integrating information technology into TEFL. *Novelty* 4./1: 32-42.
1997. Using computer networks in teaching English as a foreign language. In *English Studies and the Curriculum*. (In: Proceedings of the Second Tempus-JEN Mini Conference) Debrecen: Kossuth L. University. .pp.263-274.

### **6.2 Forthcoming publications related to the topic area of the present study**

- The Effects of Hypertextual Input Modification on L2 Vocabulary Acquisition and Retention. In M. Nikolov & J. Horvath (Eds.) *Empirical Studies in English Applied Linguistics*. Proceedings of University of Pecs Roundtable Conference, January 20, 2006.
- EFL Student Perceptions on Vocabulary Learning. Proceedings of HUSSE 6 Conference. 2003 Debrecen, January 28-31.

### **6.3 Unpublished conference papers**

- 2001 “Önálló nyelvtanulás a digitális világban”. XI. Magyar Alkalmazott Nyelvészeti Kongresszus. 17-19/ 04/ 2001. Pécs.
- 2001 “Speaking Computers as a Second Language” Integrating New Literacies into Pre-service English Teacher Training. HUSSE 5 Conference. 25-27/ 01/ 2001 Eger.
- 2001 “A modern informatikai és kommunikációs eszközök felhasználása a nyelvoktatásban és a nyelvtanárképzésben”. Az új információs és kommunikációs technológiák helye a pedagógusképzésben Conference 11-12/ 01/ 2001, Pilisborosjenő.

### **6.4 Unpublished dissertations**

- 1996 *The Possibilities of Applying Information Technology in the Pre-service EFL Teacher Training Programme at CETT Debrecen*. M.A. Dissertation. The University of Hull, England.
- 1989 *A forma és a tartalom összefüggései a mikroszámítógépekre írt nyelvi oktatóprogramokban*. Doktori disszertáció. KLTE, Debrecen, 1989.