Improving Recall and Transfer Skills Through Vocabulary Building in Web-Based Second Language Learning: An Examination by Item and Feedback Type

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ABSTRACT
The purpose of this study is to investigate the effectiveness of response modes by item and feedback type in a web-based language learning program. The subjects of this study, 122 Korean tenth graders learning English as a foreign language, were placed into groups of four and were given a web-based language learning program consisting of two different varieties of item type (multiple choice and constructed response) and two forms of feedback (explicit and implicit). The results of this study suggest that the constructed response mode has a greater effect than the multiple-choice mode on the recall and the transfer of the students’ learning. Second, the explicit response mode has a greater effect than the implicit response mode on the recall and the transfer of the students’ learning. Third, there is an interactional effect between the item response mode and the feedback response mode in web-based language learning.

Keywords
Web-based language learning, Recall, Transfer, Vocabulary acquisition

Introduction
Research on learning through the web has largely focused on interactivity (Kahveci & Imamoglu, 2007; Stromso, Grottum, & Lycke, 2007; Wagner, 1997). It is commonly accepted that there are three types of interaction: interaction between the learner and the content being learned, interaction between the learner and the instructor, and interaction between learners (see Kahveci & Imamoglu, 2007, for a current review).

Interaction between the learner and the content presumes that the participation of the learner in the learning process serves as a reaction to the content. The development of web technology not only makes it possible for learners to recognize and react to the feedback presented, but such technology also makes various response modes possible (e.g., form in web-based documents). These various response modes serve as a critical medium for supporting the interaction between learners and content. Clariana & Lee (2001) point out that constructed responses are hard to manage technically and requires much effort due to the characteristics of the web. They argue that in web-based learning, constructed responses have decreased in usage and that multiple-choice formats have become more frequent; they further maintain that this trend will continue. However, along with this trend are some key points to keep in mind.

Response modes in the form of true-false, matching, and multiple-choice require recognition of related knowledge, while short answer, constructed, and completion modes require the recall of knowledge (Clariana & Lee, 2001).
Additionally, it is important to note that much of the previous research on this topic has revealed that recognition and recall are different memory retrieval processes and require different cognitive skills (Clariana & Lee, 2001; Godden & Baddeley, 1975, 1980; Martinez & Katz, 1996).

What is more, Glover’s (1989) research suggests that recall is more effective in learning than recognition, and that multiple-choice in web-based learning tends to reinforce recognition, not recall. According to constructivist assumption stressing the active construction of knowledge and situational activities (see Han, 1990), recall is a much more important intellectual activity than recognition because recall makes retrieving schemata an easier process for the learner. This coincides with the context where students construct their knowledge through the representation of specific knowledge internally and the interpretation of personal experiences. In the same context, recall plays a greater role in transferring knowledge than recognition, because recognition is a process of simply retrieving what the learner has obtained previously or what the learner has memorized (Han, 1990).

Viewed from the fact that recall and recognition are two different cognitive processes and that recall is closely related to the transfer of knowledge, it is unfavorable to adopt a multiple response mode that requires recognition in web-based learning. Graff (2003) suggests that introducing design principles that incorporate the learners’ cognitive style (i.e., holistic and analytic) with content might be instrumental in developing an effective instructional program. Thus, what is needed at this time is to test response modes that support active intellectual recall and the transfer of knowledge matching to the context. More specifically, it is the explicit response presented at the time when feedback is given that requires greater concern. We define the explicit response as an action offered after providing an answer to multiple response modes such as keyboard input, feedback, written answers from the students, among others.

In terms of response modes, in his summary of several related studies, Tobias (1973) concluded that the constructed response is the most effective for all academic achievements. He also found that the explicit response results in better achievement than the implicit response, allowing more time for students to reflect and engage in a short reading after responding to multiple-choice items. According to Clariana & Lee (2001), the multiple-choice response, which they presented as an explicit response, received a higher achievement score than the constructed response in learning vocabulary in the field of instructional design. On the effectiveness of various response modes, familiarity and difficulty are the variables that had the greatest impact on learning. In terms of unfamiliar or difficult content, the constructed and the explicit response modes were more effective than the multiple-choice and implicit response modes on achievement, while there was no significant difference between response modes when students had a higher level of familiarity with the content (Clariana & Lee, 2001; Tobias, 1973).

Another importance in the design of language learning lies in the level of information processing at the lexical level. Koda (1996) asserts that in the process of reading, the reader constructs meaning from the information provided in the text. She further posits that reading comprehension occurs as a result of the interaction between the reader’s own pre-existing knowledge (i.e., schemata) and the information provided in the text. In terms of vocabulary learning, it is believed that the rate of memorized words is predicted to be determined by the level of information processing (Liu, 1992), and is thus connected to the process of reading (Koda, 1996). This implies that vocabulary acquisition should be organized in a meaningful way rather than just in repetition.

Through reviews of the literature on recall and recognition in web-based learning, one might deduce that the constructed response mode is more effective than the multiple-choice mode, the explicit response mode has an effect on the recall and the transfer of the knowledge, and the type of response mode makes a difference in effectiveness according to the difficulty level and familiarity of the learning tasks. The present study contributes to the theoretical background of the effectiveness of response modes, considering cognitive traits of learners and levels of learning tasks by testing the effects of various response modes on recall and transfer of learning according to the level of the learning task’s difficulty and information processing.

Response Modes in Web-Based Learning

Generally, the term response in web-based language learning is understood as the feedback provided as a result of learners’ responses to items in the activity. In this instance, the computer keeps the result of responses (i.e., an answer or a selection among the examples provided), and such responses are either an action of the student or an indication for one among provided examples. Gredler (1999) defined response modes as a way of answering a
question or a reaction to the learning materials presented to them. She suggests that there are two types of response modes: a multiple-choice response, where the learner merely selects the answer, or a constructed response, where the student produces an answer. In a web-based environment, a multiple-choice response is a type of selective frame providing the student with numerous examples, from which the student chooses the right answer. A constructed response would require the learner to construct an answer, such as a sentence, paragraph, essay, etc., calculating a mathematical problem or drawing a diagram.

Response Modes by Item Type

Usually items for questioning are grouped into either a selection type or a constructed type (Gredler, 1999). The selection type includes true-false, matching, and multiple-choice items. This type of questioning is sometimes referred to as recognition because it requires the recognition process of confirming one selection among several possible answers (Grunlund, 1993). True-false items give a statement to the students, requiring that they judge whether the statement is true or false. Web-based true-false items are typically made of a radio button form field. Matching the type of item is a questioning method which provides both a series of presuppositions and answers, asking students to make an appropriate match between them, such as terminology, sentence, and symbols which could be used for either the presupposition or the answer. Web-based matching items are mainly composed of a check box form field and multiple-choice items are made up of an item stem and two or more answers from which to select. The item stem consists of an interrogative or incomplete sentence. On the web, when there is one correct answer, a radio button is used. When there are two correct answers such as the multiple-response variety, multiple-choice responses with check box form fields are adopted.

<table>
<thead>
<tr>
<th>Example of a multiple-choice item</th>
<th>Which of the following is a chemical transition?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example of a multiple-choice item on the web</td>
<td>Which of the following is a chemical transition?</td>
</tr>
<tr>
<td></td>
<td>○ Water frozen to form ice.</td>
</tr>
<tr>
<td></td>
<td>○ A piece of paper burnt into ash.</td>
</tr>
<tr>
<td></td>
<td>○ A rock smashed into pieces.</td>
</tr>
<tr>
<td></td>
<td>○ Salt dissolved in water resulting in salt water.</td>
</tr>
</tbody>
</table>

A selection type of item is characterized by its structuredness and objectification. Its main objective is to determine the student’s ability to identify, select, and recognize the correct answer among several choices. In this case, the instructional designer makes up items inclined to target memorization and fragmentary knowledge.

A constructed type of item includes short answer, completion and essay formats, and is often referred to as the subjective type of response. This is characterized by expecting the student to type in the correct answer. Such items are also referred to as recall in that they require the learner’s retrieval process to generate an answer without any prompts (Grunlund, 1993). Short answer items require such answers as a short sentence, a phrase or numbers. The web-based version of this is made up of a one-line text box with a form field (see Table 2 below).

The completion type of item is similar to a cloze activity that contains a blank in a sentence, figure, or diagram to be completed by the student. The web-based type of completion is composed of a one-line text box with a form field.
Table 2. Example of a short answer

| Example of a short answer type | 1. Who wrote Hamlet?  
|                               | 2. List three types of reliability. |
| Example of a short answer type on the web | 1. Who wrote Hamlet?  
|                               | 2. List three types of reliability. |

Table 3. Example of a web-based completion item

| Example of a completion type | 1. The author who wrote Hamlet is _______________________. |
| Example of a completion type on the web | 1. The author who wrote Hamlet is _______________________. |

An essay item requires the student to write a minimum of one paragraph, given a particular situation or topic. The web-based version is made up of a scrolling text box with a form field.

Table 4. Example of a web-based essay item

| Example of essay type | In 100 words or less, write about the necessity of computers in our daily life. |
| Example of essay type on the web | In 100 words or less, write about the necessity of computers in our daily life. |

Although the retrieval process of information is different, depending on the item type, the multiple-response mode rather than the constructed response mode is more frequently adopted in instructional situations. Clariana & Lee (2001) argue that the use of the constructed response mode has decreased in use compared to the multiple-choice response mode and this trend will continue in web-based learning. They maintain that the reason for the decreased use of the constructed response mode is due to the technical difficulties of creating this type of item on the web. In particular, it is difficult to score constructed responses because they cannot be automatically identified as correct or incorrect like multiple-response items. In contrast, the multiple-choice response mode, which is a type of recognition test, is preferred in web-based learning due to its easy implementation and fast loading on the web. However, there are two main reasons why the constructed response mode, a type of recall test, should be implemented in web-based learning. The first reason is that recalling and recognizing produce different learning outcomes of declarative knowledge (Clariana, 2003). The second reason is that much of the research supports the notion that recalling tasks are more effective learning tools than recognition tasks (Clariana & Lee, 2001; Tobias, 1973).

Response Modes by Feedback Type

One of the advantages the computer has for instructional designers is that it supports the elaboration of stimuli in digital formats and their presentation to students. Another advantage is that the computer elicits a response from the student and provides immediate, detailed and relevant feedback (Gagné & Wagner, 1988). Most feedback contains information on the adequacy or inadequacy of the students’ performance. As in the classroom, web-based learning can also provide various types of feedback (i.e., implicit and explicit). However, the difference is that the web-based context may reduce the affective filter (see Krashen, 1982) that the learner may have in the potentially coercive environment of teacher driven instruction.

Richards (1989) tested the effects of explicit and implicit feedback provided by the computer. In this study, the explicit response is the constructed response, where following the erroneous response the student is prompted to retype the correct answer in response to the feedback pertaining to the explanation of the correct response. The implicit response provides feedback without the opportunity for the learner to provide the correct response. The
results indicate that explicit feedback followed by the opportunity for the learner to provide the correct answer results in higher academic achievement than implicit feedback followed by the provision of the correct answer in the recall and recognition post-tests. Therefore, one might conclude that by leading the learner to the correct answer while providing explicit feedback may increase the academic achievement of students in web-based learning. This result is similar to the findings of Tobias (1973) and Clariana & Lee (2001).

**Research Questions**

As the above review of the literature has indicated, there are several questions that have arisen in previous work examining the effectiveness of response modes and feedback types on Korean students’ recall and transfer of English vocabulary. This study focuses on the following research questions: (1) Are there any differences in the recall and transfer of vocabulary between item types in a web-based language learning program? (2) Are there any differences in the recall and transfer between explicit and implicit feedback types in a web-based language learning program? (3) Are there any interactional effects between item types and feedback types on the recall and the transfer of English vocabulary?

**Research Methods**

**Research Subjects**

One hundred twenty two tenth graders, with an average age of 16 years, from a large metropolitan high school in South Korea were the subjects of this study. The participants came from 4 separate classes in the same school. The participants were randomly assigned into two groups for the various tasks in the study.

**Recall Pre-test**

The pre-test for the recall of English words was administered so as to determine the homogeneity of the groups. The pre-test consisted of 20 items from the Korean National Standard English Curriculum and the maximum score was 20 points. These tests are modeled after Han (1990) and Yoon (1997)’s test around vocabulary in a Web-based language learning program.

The results of the pre-test are presented in Tables 5 & 6. These tables show that groups are homogeneous in terms of the recall test.

**Table 5. t-test for Recall Pre-test Means of the Two Item Types**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructed</td>
<td>60</td>
<td>9.03</td>
<td>4.770</td>
<td>120</td>
<td>720</td>
<td>473</td>
</tr>
<tr>
<td>Multiple-choice</td>
<td>62</td>
<td>9.70</td>
<td>5.466</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6. t-test for Recall Pre-test Means of the Two Feedback Types**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit</td>
<td>59</td>
<td>9.44</td>
<td>5.396</td>
<td>120</td>
<td>1.486</td>
<td>140</td>
</tr>
<tr>
<td>Implicit</td>
<td>63</td>
<td>8.06</td>
<td>4.836</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructional Events and Flow in the Web-based Language Learning Program**

A Web-based language learning program was developed with the specifications described below. The design principles and flow of the web-based language learning program were based on Gagné’s (1985) instructional events. The program was developed using the following design principles, forms, and media formats (see Figures 1 and 2).
Learning Material and Sample Screens in the Web-based Language Learning Program

The content for this study consisted of 20 items from the Korean National Standard English Curriculum for tenth graders. The words were presented in two formats, ten each in a dictionary format and in a contextual format. The dictionary format was adopted from Naver’s English Dictionary (http://endic.naver.com) and the contextual format was adopted from Yoon (1997) which includes the word in a sentence.

The beginning screens for the web-based program are presented in Figure 3. When the user logs in, the screen presents 4 tests from which to choose.
Clicking one option on the screen leads the user to the recall test consisting of 20 items as shown in Figure 4. To avoid potential user problems and unnecessary actions, Internet Explorer’s tool box and the use of the right mouse button are blocked. If the user does not answer a question and tries to skip an item, a warning pop-up window opens, prompting the user to answer the item.

After the recall test takes place, the instructional component of the program begins. Ten words in the dictionary format followed by 10 words in the contextual format are presented as shown in Figure 5.
Next, the user answers a series of questions through input forms on the screen according to the response modes as shown in Figure 6. In order to control the response time for all participants and reduce the potential threat of validity, each participant has a time limit of 30 seconds to respond to each item. After 30 seconds, the program proceeds to the next screen regardless of the user’s response.

During the feedback stage, either the explicit response mode or the implicit response mode is presented according to the selected option. In the explicit response mode, the full explanation is presented again (see Figure 7).
Post-tests for Recall and Transfer

When the instructional session ended, the recall and transfer post-tests were administered. These tests were modeled after Han (1990) and Yoon (1997)'s test around vocabulary in a Web-based language learning program. The recall post-test was a paper-based test where the user was asked to write a definition of the presented vocabulary. The transfer post-test was also paper-based, and asked the user to write new sentences using the vocabulary presented during the instructional session. The students were required to write their selected words in sentences keeping the appropriate context in mind. The items used for the post-test were 20 vocabulary words, with a maximum score of 20. In order to measure the internal consistency reliability of the post-test, the Cronbach’s Alpha was applied, with .91 for the recall post-test, and .86 for the transfer post-test. These results clearly exceed the standard level of “acceptability” for this type of test (i.e., .70).

Results and Interpretation

Descriptive Analysis

The participants were randomly assigned to the groups receiving the various treatments. Tables 5 and 6 show the means and standard deviations of each group for the recall and transfer tests.

Table 5. Means and Standard Deviations of the Recall Test by Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Multiple</th>
<th>Constructed</th>
<th>Implicit</th>
<th>Explicit</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>62</td>
<td>60</td>
<td>63</td>
<td>59</td>
</tr>
<tr>
<td>Mean</td>
<td>9.60</td>
<td>12.28</td>
<td>9.05</td>
<td>12.92</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>5.880</td>
<td>5.396</td>
<td>5.144</td>
<td>5.799</td>
</tr>
</tbody>
</table>

Table 5 shows that the explicit group has a mean of 12.92 which is the highest, whereas the implicit group has a mean of 9.05 which is the lowest in the recall test. This result implies that the explicit response is more effective than the implicit response in the recall test.
Table 6. Means and Standard Deviations of the Transfer Test by Group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Multiple</th>
<th>Constructed</th>
<th>Implicit</th>
<th>Explicit</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>62</td>
<td>60</td>
<td>63</td>
<td>59</td>
</tr>
<tr>
<td>Mean</td>
<td>5.60</td>
<td>8.03</td>
<td>5.38</td>
<td>8.31</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>4.779</td>
<td>4.547</td>
<td>4.419</td>
<td>4.775</td>
</tr>
</tbody>
</table>

Table 6 shows that the explicit group has a mean of 8.31 which is the highest, whereas the implicit group has a mean of 5.38 which is the lowest in the transfer test.

Differences in Recall and Transfer Between Item Types

The difference in the recall test between the item types is presented in Table 7. The \( t \)-test procedure was applied for the mean scores of the constructed and the multiple response groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>( t )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructed</td>
<td>60</td>
<td>12.28</td>
<td>5.40</td>
<td>120</td>
<td>2.627</td>
<td>.01</td>
</tr>
<tr>
<td>Multiple-choice</td>
<td>62</td>
<td>9.60</td>
<td>5.88</td>
<td>120</td>
<td>2.883</td>
<td>.005</td>
</tr>
</tbody>
</table>

Table 7 shows that there is a significant difference in the recall test score between the two response modes in the web-based language learning program, which suggests that the constructed response mode has a greater effect than the multiple-response mode on the recall in the web-based language learning program.

The difference in the transfer test between the item types is presented in Table 8. A \( t \)-test procedure was applied for the mean scores of the constructed and the multiple response groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>( t )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructed</td>
<td>60</td>
<td>8.03</td>
<td>4.55</td>
<td>120</td>
<td>2.883</td>
<td>.005</td>
</tr>
<tr>
<td>Multiple-choice</td>
<td>62</td>
<td>5.60</td>
<td>4.78</td>
<td>120</td>
<td>3.902</td>
<td>.000</td>
</tr>
</tbody>
</table>

As table 8 shows, there is a significant difference in the transfer test score between the two response modes in the web-based language learning program. This result indicates that the constructed response mode has a greater effect than the multiple-response mode on transfer in the web-based language learning program.

Differences in the Recall and Transfer Between Feedback Types

The difference in the recall test between the feedback types is presented in Table 9. A \( t \)-test procedure was applied for the mean scores of the explicit and implicit response groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>df</th>
<th>( t )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit</td>
<td>59</td>
<td>12.92</td>
<td>5.80</td>
<td>120</td>
<td>3.902</td>
<td>.000</td>
</tr>
<tr>
<td>Implicit</td>
<td>63</td>
<td>9.05</td>
<td>5.14</td>
<td>120</td>
<td>3.902</td>
<td>.000</td>
</tr>
</tbody>
</table>

It is clear from the data presented in table 9 that there is a significant difference in the recall test score between the two feedback types in the web-based language learning program. The results suggest that explicit feedback has a greater effect than implicit feedback on recall in the web-based language learning program.

The difference in the transfer test between the feedback types item is presented in Table 10. A \( t \)-test procedure was applied to the mean scores of the explicit and implicit response groups.
As is indicated in table 10, there is a significant difference in the transfer test score between the two feedback types in the web-based language learning program, which suggests that explicit feedback has a greater effect than implicit feedback on transfer in the web-based language learning program.

**Interactional Effect between Item Types and Feedback Types on Recall and Transfer**

The interactional effect between the item types and the feedback types on the recall test score in the web-based language learning program was tested using a two-way ANOVA. The results of the analysis are shown in Table 11.

Table 11 shows that there is an interactional effect between the item types and the feedback types on the recall test score in the web-based language learning program. As shown in Figure 8, the constructed response combined with the explicit response has the highest recall score, whereas the multiple-choice response has the lowest recall score.

To test the interactional effect between the item types and the feedback types on the transfer test score in the web-based language learning program, a two-way ANOVA procedure was applied. The results of the analysis are shown in Table 12.
Table 12. Two-way ANOVA for Transfer Scores of the Item and Feedback Types

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item types</td>
<td>177.662</td>
<td>1</td>
<td>177.662</td>
<td>9.480</td>
<td>.003</td>
</tr>
<tr>
<td>Feedback types</td>
<td>252.510</td>
<td>1</td>
<td>252.510</td>
<td>13.473</td>
<td>.000</td>
</tr>
<tr>
<td>Item x Feedback</td>
<td>154.413</td>
<td>1</td>
<td>154.413</td>
<td>8.239</td>
<td>.005</td>
</tr>
<tr>
<td>Error</td>
<td>2211.498</td>
<td>118</td>
<td>18.742</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2793.877</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12 shows that there is an interactional effect between the item and feedback types on the transfer test score in the web-based language learning program. As shown in Figure 9, the constructed response combined with the explicit response has the highest transfer score, whereas the multiple-choice response has the lowest transfer score.

Discussion

This study sought out to investigate the effectiveness of response modes by the type of item difficulty and information processing levels in a web-based English language learning program. Also this study focused on analyzing the interaction between the item and feedback types which effect students’ performance. Based on the results of the data presented above, the following are the implications for this study.

First, there is a difference between groups in the effect of the response modes on the students’ recall. Most importantly, the constructed-explicit response has the biggest effect on the students’ recall in the web-based language learning program. In addition there is a difference in the effect of the response modes on the students’ transfer in the web-based language learning program. The constructed-explicit response has the largest effect on the students’ transfer. These findings support the findings of other research in vocabulary acquisition. For example, Nation (1990) argues that both direct instruction (such as the explicit feedback provided in this web-based program and contextual learning (such as the constructed response mode used in this web-based program) are useful in promoting vocabulary learning. This claim is further supported by Paribakht & Wesche (1997), who maintain that a combination of contextual learning and direct instruction is a better approach to vocabulary acquisition than context alone.

Second, there is a difference in the effect of the item types on the students’ learning. That is to say, the constructed response mode has a higher effect on the learners’ recall and transfer than the multiple-choice response mode. This supports the notion that the multiple-choice response mode facilitates recognition and that the constructed response
mode facilitates recall. These findings also suggest that a deeper examination of the theory of vocabulary acquisition is needed in order to fully understand such concepts as “receptive” and “productive” vocabulary knowledge (see Coady, 1993; Grabe & Stoller, 1997).

Third, there is a difference in the effects of the feedback types on students’ learning. More specifically, the explicit response mode has a greater effect on recall and transfer than the implicit response mode. These findings suggest that the explicit response mode draws an active response from the students, and thus helps to activate their knowledge. The issue of feedback in the language learning context is a topic that is also highly debated, with empirical evidence to both support and refute its effectiveness (see Norris & Ortega, 2000, for a meta-analytic review of feedback). The bulk of the research on feedback is on oral corrective feedback (typically in teacher/student and native/non-native speaker settings), whereas the present study contributes to the discussion by focusing on computer-generated feedback. For a review of the significant research on corrective feedback in the language learning context, see Miller (in press).

Fourth, there is a significant interaction between the item types and the feedback types on students’ recall and transfer, with the constructed-explicit response mode having the greatest effect. This result indicates that the response mode which requires an active response from the learner affects the recall and the transfer of the students’ learning. This finding also supports the ideas of contextualized learning and direct instruction found in the body of research (see Nation, 1990 and Paribakht & Wesche, 1997).

Conclusion

As was noted in the results and further discussed above, several conclusions were reached in analyzing the data collected. From this analysis, we were able to address the research questions initially posed at the onset of the study.

Are there any differences in the recall and transfer of vocabulary between item types in a web-based language learning program?

In considering the first research question, the results suggest that constructed responses have a greater effect than multiple-choice responses on the recall and transfer of students in a web-based language learning environment. This conclusion supports the information processing theory on recall and transfer.

Are there any differences in the recall and transfer between explicit and implicit feedback types in a web-based language learning program?

The explicit response mode as feedback has a greater effect than the implicit response mode on the recall and transfer of vocabulary in a web-based language learning environment. This implies that response modes requiring the active participation of the students can affect academic achievement more than just clicking along a given path in a web-based language learning environment.

Are there any interactional effects between item types and feedback types on the recall and the transfer of English vocabulary?

Based on the results of this study, one can conclude that there is an interactional effect between the item types and the feedback types on the recall and transfer of vocabulary in a web-based language learning environment. It is especially interesting to note that the constructed-explicit response mode maximizes the effects on recall and transfer.

Limitations & Future Research

Although this study clearly contributes to our understanding of recall and transfer in web-based vocabulary learning, there are limitations to consider. First, the focus of the study was on testing for statistical significance. Future research should consider mixed designs or studies that examine qualitative aspects of the topic. In terms of research design, there is also a limitation in that the participants were forced to provide a response, even if that meant
guessing at the right answer. The potential error that this produced in the results could not be treated through statistical analysis.

Additionally, in order to understand the reading process better (including vocabulary acquisition), there are several questions that future research should consider. The first is to explore the effect of different learning tasks in a web-based language learning program, considering the specific characteristics of the tasks. This study focused only on the item difficulty level. Although the focus of this study was on the memorization of vocabulary, one might compare the results between different types of vocabulary, such as content and function words and receptive and productive vocabulary (Aebersold & Field, 1997). The frequency of the vocabulary, or whether it is “core” to the genre being learned, is another area of future research (Grabe & Stoller, 1997). It is also important to consider how web-based language learning programs might impact vocabulary acquisition in the reading context (e.g., comparing the effect it may have in the top-down and bottom-up approaches to reading). Future research should also consider the effect web-based vocabulary learning may have in the context of direct versus indirect instruction (see Nation & Newton, 1997). Other types of response mode may also be considered in future studies on web-based language learning.

References


