

## Chapter XII

# Designing a Constructivist Vocabulary Learning Material

**Ayşegül Daloğlu**

*Middle East Technical University, Turkey*

**Meltem Baturay**

*Gazi University, Turkey*

**Soner Yildirim**

*Middle East Technical University, Turkey*

### ABSTRACT

*This chapter outlines how the constructivist approach can be implemented in Web-based vocabulary teaching, characteristics of effective Web-based vocabulary teaching materials, and a model for effective Web-based vocabulary teaching and recycling. In WEBVOCLE which stands for Web-Based Vocabulary Learning, contextual presentation of the words has been enriched with audible vocabulary and repeated with interactive exercises, games, and puzzles in 'spaced revisions' in a constructivist Web-supported environment. The content of the implementation has been additionally supported with pictures. Feedback obtained from the learners demonstrates that they not only developed a positive attitude toward English language learning, but also improved their learning outcomes.*

### INTRODUCTION

Current developments in information technologies with computers and the Internet have resulted in rapid advances in the application of technology in education. However, rather than focusing on

the principles of human learning and use of technology (Internet), most current literature deals with differences on the achievement of learners between Web-based and conventional training so far. In order to shed light on learning theories and psychological facts, this chapter outlines: (a) how

the constructivist approach can be implemented in Web-based vocabulary teaching, (b) characteristics of effective Web-based vocabulary teaching materials, and (c) a model for effective Web-based vocabulary teaching and recycling.

## **REVIEW OF LITERATURE**

### **Computer-Based Language Instruction**

The global popularity of the Internet over the past decade has brought about its innovation in education and in foreign language learning and teaching. Many studies affirm that learners consider the Internet a useful means to discover and learn new vocabulary (Alshwaikh & Sami, 2004; Johnson & Heffernan, 2006; Ma & Kelley, 2006) and to supplement in-class instruction (Kung & Chuo, 2002). Other research studies specific to vocabulary acquisition point out that words can be taught more effectively and in an enjoyable and even amusing way with the use of computers and Web-based materials (Labrie, 2000; Tsou, Wang, & Li, 2000; Tozcu & Coady, 2004).

When the use of technology in education emerged nearly thirty years ago, a major concern was that the unavoidable infusion of technological devices into our educational system would replace some of the educators, and that the computer would make the classroom obsolete. Throughout the years it has been experienced that the corresponding developments in technology and interactive processes lead to improved learning by enriching the teaching-learning process. In fact, computers and the Internet, defined by Rice as “the new media” (1984, as cited in Chou, 2003), has allowed or facilitated interactivity in educational applications which enhances learning potential. Regarding this, Borsook and Higginbotham (1991, as cited in Chou, 2003) claim that “the computer’s interactive potential makes it unique in the history of educational/instructional technology and

sets it apart from all other instructional devices” (p. 267). Information and communication technologies (ICTs) have particularly changed the language learning environment and settings. It has transformed learning from a traditional, passive experience to one of discovery, exploration, and excitement by enhancing learners’ critical thinking, problem-solving, and communication skills (Young, 2003).

Recent research studies demonstrate that language teaching, in order to be effective, requires a high level of interactivity. The growth in the use of multimedia computer as a learning tool has brought new opportunities to the design and implementation of foreign language learning activities. Multimedia has the power to move the lesson beyond the traditional walls of the classroom, to provide flexibility in individualizing the activities, to integrate the lesson with the needed authenticity, to enhance communication and discovery-oriented learning by the help of cooperative work in groups, to involve language learners in the learning process by their senses, to reduce or eliminate learners’ initial linguistic and psychological barriers, and to create an effective and interactive learning environment (Foster, 1996; Young, 2003; Yang, 1998; Adair-Hauck, Willingham-McLain, & Youngs, 1999; Plass et al., 1998). In addition, Pusack and Otto (1997) claim that the strength of multimedia comes from the synergy provided by the variety of skills (listening, reading, writing, and speaking) that are linked together in meaningful ways to deliver in-depth experience. Multimedia learning provides the learner with information on different (e.g., visual, auditory) modes.

### **Main Characteristics of Constructivist Learning**

As presented by Fosnot (1992), constructivism is “a theory of ‘knowing’ and a theory about ‘coming to know’” (p. 168). Therefore, a constructivist approach to instruction requires an understanding

of how learners make meaning so that learning environments, methods, and materials can promote knowledge construction. Based on these, it is possible to conclude that “education is about using knowledge, not acquiring it” (Vermette et al., 2001, p. 3) and “constructivism is a psychological theory that construes learning as an interpretive, recursive, building process by active learners interacting with the physical and social world” (Fosnot, 1996, p. 30).

Although constructivism is applied to learning and instructional theories, it can be considered an epistemological approach. Constructivism in education can be viewed in two ways: cognitive and social constructivism. The former, grounded in the work of Piaget (1954, 1970; Piaget & Inhelder, 1971), focuses on cognitive development and individual construction of knowledge, while the latter, attributed to Vygotsky (1978), emphasizes the social construction of knowledge. In the cognitive constructivist approach, learning occurs through cognitive processing of environmental interactions and corresponding constructions of mental structures to make sense of them.

There are two key Piagetian principles for teaching and learning:

1. *Learning is an active process.* Direct experience, making errors, and looking for solutions are vital for the assimilation and accommodation of information. How information is presented is important. When information is introduced as an aid to problem solving, it functions as a tool rather than an isolated arbitrary fact.
2. *Learning should be whole, authentic, and “real.”* Piaget helps us to understand that meaning is constructed as children interact in meaningful ways with the world around them. Thus, there is less emphasis on isolated exercises that try to teach vocabulary items without a context or provide learners with sentence punctuation activities. Learners still learn these things in Piagetian class-

rooms, but they are more likely to learn them if they are engaged in meaningful activities (such as operating a class “store” or “bank” for vocabulary development or writing and editing a class newspaper). Whole activities (as opposed to isolated exercises), authentic activities that are inherently interesting and meaningful to the learner, and real activities that result in something other than a grade on a test are emphasized in Piagetian classrooms.

The emergence of constructivism has coincided with the shift in pedagogy away from teacher-centered information transmission models toward knowledge-centered approaches that focus on cognitive and social processes in learning. Contrary to objectives-based approaches, instruction in constructivism does not involve prescriptive presentation strategies or accurate knowledge representation (Perkins, 1992; Reynolds, Sammons, Stoll, Barber, & Hillman, 1996). Constructivism suggests that knowledge is constructed as individuals make meaning of their experiences, and knowledge has meaning only in context. Thus, effective instruction needs to include presentations of real-world problems in authentic contexts that require collaboration (Jonassen, 1999). Therefore, the main implications of constructivism for instruction are collaboration, diverse perspectives, and authentic context (Abbey, 2000).

Since truths or facts change for each individual in that everyone interprets the gained knowledge differently, it is the learner’s responsibility to search for knowledge and create their own meaning through experiences. Instead of being provided a specified content, learners should search for knowledge from many different sources (Ertmer & Newby, 1993). By benefiting from different sources, the learner is able to have a variety of perspectives instead of adopting the fixed perspective of the instructor. The primary goal of a constructivist environment is to help learners learn how to learn; the emphasis is placed on

the learner rather than the instructor (Brooks & Brooks, 1993).

As Kaufman (2004) states, constructivism has placed a learner's individual development at the focus of instruction and learning. The interaction between learner's internal schema and the exogenous social and cultural variables contribute to the transformations in the learner's internal schemata. In this process, guidance from experts or teachers and strategies such as modeling, coaching, and scaffolding provide learners with necessary cognitive support (Jonassen, 1999). Learners benefit from the use of multiple approaches and learning experiences in the process of extracting meaning from knowledge. There are no specific methods for constructivism; however, one can benefit from cooperative learning, self-directed learning, discovery learning, and problem-based and hands-on learning activities. Assessment of the learners is done by self- or peer-evaluation, portfolios, or rubrics, which would challenge learners to recall, compare, and use what has been learned before.

In summary, Jonassen (1994) proposes eight characteristics that differentiate constructivist learning environments from traditional ones:

1. Constructivist learning environments provide multiple representations of reality.
2. Multiple representations avoid oversimplification and represent the complexity of the real world.
3. Constructivist learning environments emphasize knowledge construction instead of knowledge reproduction.
4. Constructivist learning environments emphasize authentic tasks in a meaningful context rather than abstract instruction out of context.
5. Constructivist learning environments provide learning environments such as real-world settings or case-based learning instead of predetermined sequences of instruction.
6. Constructivist learning environments encourage thoughtful reflection on experience.
7. Constructivist learning environments enable knowledge construction that is context and content dependent.
8. Constructivist learning environments support collaboration through social negotiation in the construction of knowledge, not competition among learners.

### **Vocabulary Learning and Vocabulary Retention**

Research studies in language learning and acquisition processes suggest that training in structural (grammatical) and vocabulary knowledge will not result in real linguistic competence and language proficiency. Although words alone are believed to be language, and language learning is deemed acquiring lexicon, if learners keep these lists in their personalized store without actively using them in language production, their linguistic competence will not develop. According to Kuper and Allan (2004), for many years, language teachers have ignored the techniques for helping learners to learn vocabulary, because of the viewpoints that learning a certain number of words in the target language along with their meanings was sufficient to know a language without knowing their usage in sentences.

Techniques of teaching vocabulary have emerged in history parallel with the methods in language teaching. In those years, when the Grammar-Translation Method was the typical method of teaching a foreign language, teachers taught vocabulary by providing their learners long lists of words with their equivalent translations in their native languages. Language teaching profession has realized in time that this method is not efficient to achieve communicative competence (Groot, 2000). However, bilingual word lists continue to be favored by learners. Deveci (1996) states that "many cultures, including the Turkish culture,

encourage rote learning, where learners memorize lists of words in isolation” (p. 2).

Particularly after the 1950s with the emergence of the Direct Method, teaching a word in context started to be used as a common technique. In the 1950s and 1960s, audio-lingual textbooks used a set plan for selecting and limiting vocabulary. With the new scope, by the 1970s, a communicative approach to language teaching had correspondingly affected the view to teaching of vocabulary as communicative content. This new approach obliged the use of more communicative materials and approaches such as survival English, and contextual and situational English.

However, apart from basic communicative competences, which were favored in the communicative classroom of the 1980s, strategies of language processing and language awareness, and skills in knowledge perception, production, and construction are needed to achieve successful outcomes of any language curriculum. Such competences, which are often discussed in the context of learner autonomy, are of significance for language learning. Therefore, those suggesting a rethink of a purely communicative methodology discuss the post-communicative era of foreign language learning. The constructivist paradigm is seen as an important methodological basis for real innovation in foreign language learning (Ruschoff & Ritter, 2001). Lewis (1993) is very much in line with this position by stating that, “The Present-Practice-Produce paradigm is rejected, in favor of a paradigm based on the Observe-Hypothesize-Experiment cycle” (p. vii).

With the rise of interest in vocabulary development and appearance of more innovative methods of language teaching, vocabulary learning started to be viewed as a complex matter. More specifically, it was realized that learning of word meanings calls for more than looking the words up in the dictionary since vocabulary learning is a multifaceted process. According to Tchudi and Mitchell (1989) “the look-up-the-word-and-know-it-for-the-test approach” almost lost its value

(p. 258). In order to augment learners’ learning, students are provided with the opportunities of relating the words to their personal experiences, thinking about the new words, asking questions about them, and comparing them with other words they have learned. Therefore, vocabulary instruction is viewed to be more effective when learners are involved in the construction of the meaning through interactive processes rather than simply memorizing definitions or synonyms. Besides, to communicate in meaningful and appropriate ways is the ultimate goal of the foreign language classroom (ACTFL, 1999).

Promoting the use of words in communicative situations and reintroducing these new words at regular intervals prevents forgetting (Chastain, 1976). It is believed that not to forget learned words, one should use the words in communicative situations and be exposed to these new words at regular intervals. To boost retention, revision seems to be the best approach, and if the words are presented in context, retention is much higher. According to Lewis (2000), “encountering new vocabulary on several occasions seems to be a necessity and even a sufficient condition for learning to occur” (p. 184). Concerning retention of words, it is often uttered that lack of context is thought to make vocabulary learning difficult, and the words taught in isolation are generally not remembered and/or easily forgotten. Use of words by means of meaningful repetition exercises increases the words’ retention in memory (Hatch, Evelyn, & Brown, 1995). To sum up, it is beneficial for learners to see the word usage in other contexts or learning environments, particularly in distributed phases.

According to Nation (1990, 2001), to fully acquire words, learners need to be exposed to a word 5-16 times, and frequent reencountering of the word is crucial for learners’ vocabulary acquisition. If the word is not truly stored in long-term memory, there is difficulty recalling it after some time. Not setting up a repetitive learning system for the learner, however, is one of the drawbacks



of many language courses. Ebbinghaus (1885, as cited in Waring, 2004) examined human memory and the rate of forgetting. With his scientific study of memory, he pointed out that especially repetitions that are distributed over time might allow one to remember things for a long time. According to his analyses of his own vocabulary learning, Ebbinghaus's ability to recall words he had encountered after 30 minutes was 50%, and his ability to recall after 48 hours was 25%. He therefore calculated the number of words he was able to recall for each 15-day interval. Ebbinghaus (1885, as cited in Waring, 2004) explained this result with the 'forgetting curve'. Most forgetting occurs very soon after the learning, and if the word is not met again soon, it is likely to be forgotten—that is, immediately after learning knowledge decreases rapidly, but then it decreases rather slowly. Thus, the time between the first and the second exposition should be very short (see Figure 1).

Based on Ebbinghaus's (1885) forgetting curve, Pimsleur (1967, as cited in Waring, 2004) proposed that every time we relearn something, the knowledge gets stronger and is therefore more resistant to decay. Pimsleur's 'graduated interval recall' schedule shows that the gap between the second encounter and the subsequent encounters

with the word should progressively widen if there is to be 100% recall (see Figure 2). Thus, the forgetting curves get less steep as relearning continues. Owing to this, the intervals between the revisions of words should increase. According to Pimsleur, this schedule outlines the "ideal" schedule for learners to keep new vocabulary knowledge in mind. In Figure 2,  $t_0$  refers to the first time the word is learned;  $t_1$  refers to the first relearning, and so on.

As indicated in Figure 2, the gap of a few minutes between time0 and time1 is shorter than the gap between time1 and time2. Pimsleur (1967, as cited in Waring, 2004) calculated the ideal distance as multiples of five. So one revision should take place at a time period of five times longer than the previous gap. Although after about time7 the gap is very wide, there is a very high probability that the word will be located in memory because of the fact that the person has met the word six times previously (Waring, 2004).

The effectiveness of spaced revisions relative to massed revisions has been emphasized by many researchers (Dempster, 1987, 1991; Russo & Mammarella, 2002; Moshe, 1990; Bahrick, Bahrick, Bahrick, & Bahrick, 1993; Braun & Rubin, 1998). It is further stated by Dempster (1991) that "the reconstruction hypothesis [suggests] that spaced revisions encourage highly constructive thinking" (p. 75).

The findings of a study conducted by Kolich (1991) support that additional practice opportunities are needed between training and testing, after a period of time passes after the first encounter in order to help learners with word retention. Thus, the word can be moved from short-term memory to long-term memory, and it can be recalled after minutes, days, weeks, or years. Briefly, moving knowledge to long-term memory is not easy since there needs to be a lot of meaningful practice. Bygate, Skehan, and Swain (2001) state that "acquisition follows repeated exposure to examples. The more often certain sounds are heard in the

*Figure 1. Ebbinghaus's forgetting curve (1885, adapted from Waring, 2004)*

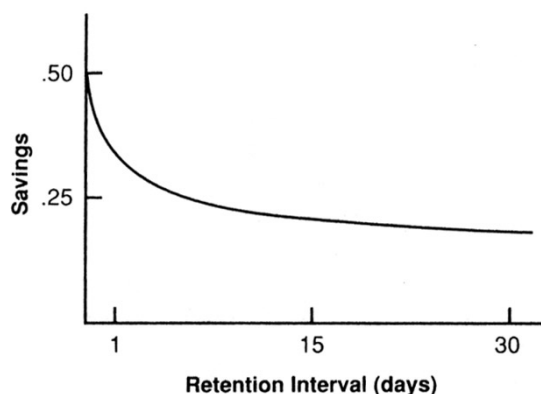
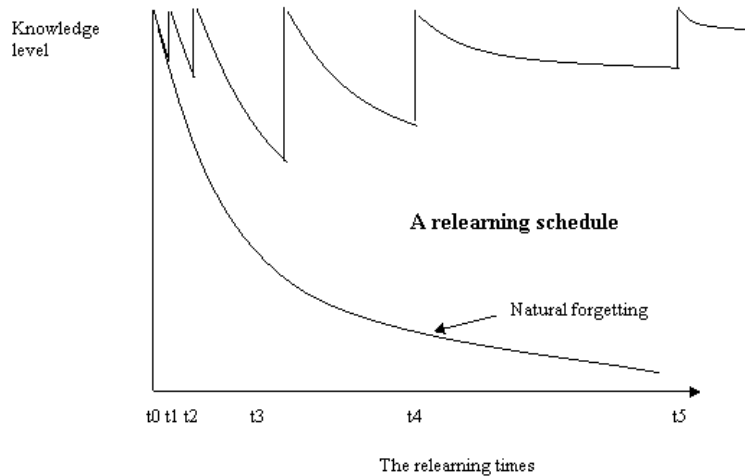


Figure 2. Pimsleur's memory schedule (1967, adapted from Waring, 2004)



same sequence the more likely is that sequence to be transferred to long-term memory” (p. 79).

Therefore, in light of research studies, spaced revision and multiple encounters with the same word stimulate vocabulary learning and enhance vocabulary retention. Besides, it also became clear that the vocabulary teaching process should stimulate learners as much as possible through more channels, that is, a multi-sensory approach is preferred to teaching of vocabulary. Stephenson (2002) supports the view that emphasizing sensory stimulation is a good thing and needs no justification. Visual, auditory, and kinesthetic stimulation in sufficient frequent applications excite the brain and improve its organization. Furthermore, learners believe in the effectiveness of stimulation and a rich sensory environment. Therefore, multi-sensory environments are effective with people of all ages and a range of disabilities.

### WEB-BASED VOCABULARY LEARNING MODEL AND LEARNER FEEDBACK

Web-based Vocabulary Learning Model (WEB-VOCLE), developed as a part of a project funded by the Scientific and Technological Research Council

of Turkey, adopts a constructivist approach and emphasizes the following features:

1. *Learner-centeredness*: Learners worked at their own pace and had freedom about their choice of studying time, the number of visits to the Web site, pace, and frequency of working on exercises.
2. *Contextualized meaning and knowledge construction*: Vocabulary was represented through various contexts and enriched with the use of multimedia tools (pictures and sound).
3. *Opportunities for production*: Learners engaged in activities that required meaningful interaction, critical thinking, and genuine language production.
4. *Immediate feedback*: Learners received immediate feedback about their language productions.
5. *Ongoing/periodic recycling*: Participants utilized this Web-based tool for the revision of vocabulary items that had been learned and studied in class, and the tool provided multiple and spaced encounters with the language to be learned.

## **The Procedure**

In the preparation phase of WEBVOCLE, the researchers tried to provide the tenets such as “multiple exposure to new words for learners”; “active, in-depth processing” with meaningful texts and exercises; “relating the new to the known”; “additional reading” with the given texts; “sound components, hints or clues related to word meanings”; and “multimodal presentation of information with online definitions, glossaries or thesauruses,” which were described by Wood (2001, as cited in Yip & Kwan, 2006) as the guidelines for designing effective vocabulary learning software.

Supporting the view presented by Laufer and Shmueli (1997, as cited in Nation, 2001) that lack of context is thought to make vocabulary learning difficult and the words taught in isolation are generally not remembered and/or easily forgotten, in WEBVOCLE, target vocabulary was presented to learners in various contexts that were carefully written by language experts. The texts surrounding vocabulary were simple enough to help comprehension and they included contextual clues. Bearing in mind that the natural word acquisition process involves acquisition of a word’s properties in various contexts, learners were introduced to many contexts for each target word.

An observe-hypothesize-experiment cycle was used in the instructional process. After studying target vocabulary in the classroom (observe), the learners read the story accompanied by pictures on the Web-based tool at the beginning of each module (see Figure 3) and completed the follow-up comprehension exercise (hypothesize). In subsequent weeks, learners were exposed to all target vocabulary items a minimum of three times, in two or three exercises (experiment) (see Figure 4). As the study and the Web-based tool did not attempt to provide the learner with all possible meanings and uses of the target vocabulary, but only the meaning studied in class, the researchers deemed seven or eight exposures altogether to be

adequate for the addition of the lexical information into learners’ long-term memory (see Table 1).

Considering the research studies that show that when foreign language learners are presented with various forms of lexical information in addition to text, comprehension increases (Johnson & Heffernan, 2006), target vocabulary items in the texts were presented in the form of a mini dictionary, with the definition of the word in English, pronunciation, and synonyms if there were any. Besides this, it was thought that this mechanism might help the readers of the texts who might lack confidence in their guesses.

In WEBVOCLE, vocabulary was reinforced in learners’ long-term memory with subsequent exercises such as matching, gap filling, multiple choice, and cloze tests next to puzzles and vocabulary games. As Nation (2001) suggests, real vocabulary learning happens only if the vocabulary is used both receptively and productively by the learners. Therefore, the learning tasks or exercises on the system were designed to test not only recognition but also production of learners. Apart from aforementioned exercise types, comprehension exercises were added to each module after the texts believing that by doing comprehension exercises, the learners would become familiar with the meaning and usage of words. Vocabulary games, on the other hand, were included in the retention exercises to increase motivation of learners. According to the results of their study, Yip and Kwan (2006) commented that online vocabulary games help learners to learn better and the learned vocabulary is retained for a longer period of time. To monitor users’ performance and the total time spent on the software, the scores obtained from the exercises in each application were recorded by the system and these data serve to evaluate the effectiveness of the software.

A learning object is not only a digital entity deliverable over the Internet, but it is defined as “any digital resource that can be reused to support learning” by Wiley (2002, p. 7). As Wiley (2000)



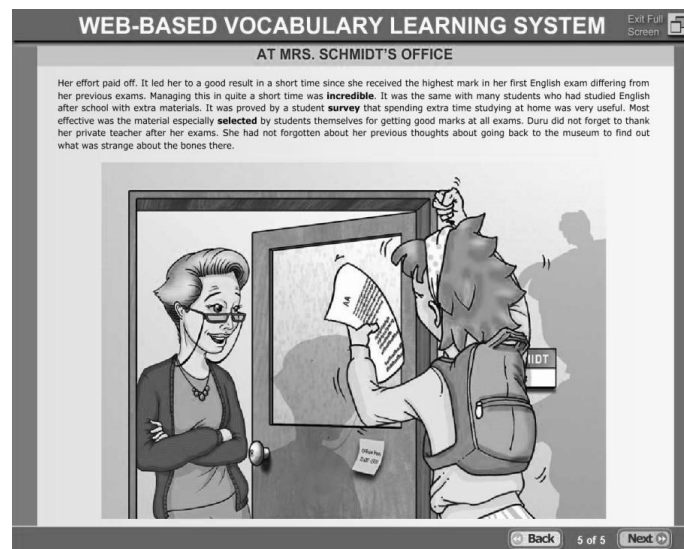
exemplifies, learning object systems include some multimedia content, instructional content, learning objectives, instructional software, and software tools and persons during technology-supported learning. Technology-supported learning might include computer-based, collaborative, and interactive learning environments or intelligent computer-aided instruction and distance learning systems. According to these definitions, WEBVOCLE is an interactive distance learning system that includes multimedia-supported instructional content. Although WEBVOCLE is a time- and place-flexible digital resource, it can be considered a learning support tool. Learning objects encompass sound pedagogical principles and instructional design theories for educational purposes. Instructional features such as games and exercises used in WEBVOCLE may also serve as learning objects to other similar applications in the future.

The theoretical rationale for the tool is based on spaced revision technique, which originates from the way memory works, and in the Web-based program, increasing intervals of time between subsequent reviews of vocabulary items was ap-

plied (Ebbinghaus, 1885, as cited in Waring, 2004). Therefore, there was a systematic application of the state-of-the-art knowledge in articulating the theoretical rationale for the material's design choice (Akker, Branch, Gustafson, Nieveen, & Plomp, 1999). To guarantee word retention in memory, learners make revisions, which become less and less frequent after a time. As learners used this Web-based tool, the progress they demonstrated was explored. The intervention was delivered at real user settings with the participants of the same level of English.

WEBVOCLE was implemented at Gazi University English Language Preparatory School over the spring semester for 11 weeks in the 2006-2007 academic year. The English language learners who used the tool were at intermediate-level language proficiency as determined by the institutional English proficiency exam. In the implementation, a within-subject design was used with 69 participants who were exposed to the Web-based vocabulary learning tool (WEBVOCLE) as a supplementary material to in-class learning; that is, the system enabled the revision of pre-learned vocabulary items in a Web-based

Figure 3. A sample story page. The words in bold are clickable, and when clicked the definition and pronunciation of the words are given. This constitutes the observation stage of the lesson.



## Designing a Constructivist Vocabulary Learning Material

environment. Learners used the tool with time and place flexibility. WEBVOCLE was released to learners' access on the address line of Internet Explorer, <http://www.bdee.net/words/a>, and it is still in use.

Table 1. Instructional design of WEBVOCLE

(1) week	A
(2) week	B, A1
(3) week	C, B1
(4) week	C1, A2
(5) week	B2
(6) week	C2
(7) week	A3
(8) week	B3
(9) week	C3

*A—Words taken from the first set of vocabulary items (Words are given in context followed up by a comprehension exercise and a vocabulary game.) (Figure 3)*

*B—Words taken from the second set of vocabulary items (Words are given in context followed up by a comprehension exercise and a vocabulary game.)*

*C—Words taken from the third set of vocabulary items\* (Words are given in context followed up by a comprehension exercise and a vocabulary game.)*

*\* Vocabulary items in A, B, C sets were chosen from the students' course books.*

Figure 4. Drag-and-drop exercise—this constitutes the experiment stage of the lesson.

WEB-BASED VOCABULARY LEARNING SYSTEM

[Exit Full Screen](#)

Drag and drop the words given in the box to the appropriate places.  
Be careful there are more words given than you need.

Time Left: 10: 47

True: 0 False: 0

	advertisement rectify	offend	appropriate prevent	puzzled conventional	puzzles	praise donate	selection indication
1.	Mary bought a nice present for her daughter's birthday. She asked the saleswoman to .....wrap..... it in colorful paper.						
2.	I don't understand it when people keep their cell phones on during concerts. I think it ..... the musicians when they ring. They probably get upset and their performance suffers terribly.						
3.	Babies are amazing when they are about a year old. They cannot understand that their hands belong to their own body. They raise them up and look at them with ..... looks.						
4.	A: Can I wear jeans and sweat shirt to the party tonight? B: Oh no! All the directors and heads of departments will be there. A suit would be ..... for this party.						
5.	According to some experts, horses and dogs bark and run around about five minutes before an earthquake. Their behavior could be accepted as a(n) ..... of a disaster.						
6.	Some teachers always pay attention to students who get high marks all the time. They should actually ..... the students who can manage to get high marks occasionally to encourage them.						
7.	Certain successful businessmen ..... money and clothing to the children of poor families. They give these to support them while they are going to school.						
8.	Scientists have not been able to find a solution to ..... earthquakes from causing a lot of damage to buildings. They have only been able to reduce the amount of bad damage happening to people.						
9.	I use cell phones regularly. However, how we can hear another person's voice from far away through such a small machine still ..... me. I find it hard to understand it.						
10.	Yesterday, the newspapers put the wrong picture with the wrong name. The real person in the picture called the newspaper and asked them to ..... their mistake. A correction appeared on the back page of the newspaper.						
11.	The small town near Antalya holds a competition every year to chose the biggest tomato raised there. This became ..... when it became very popular in the 1990s.						

Evaluate

The exercises in each revision application are as follows:

X1 Second Revision Application:

- Choose the appropriate word (in combo boxes)
- Fill-in-the-blanks-by-writing exercise.
- Fill-in-the-blanks exercise (drag and drop) (Figure 4)

X2 Third Revision Application:

- Matching exercise
- Multiple-choice test

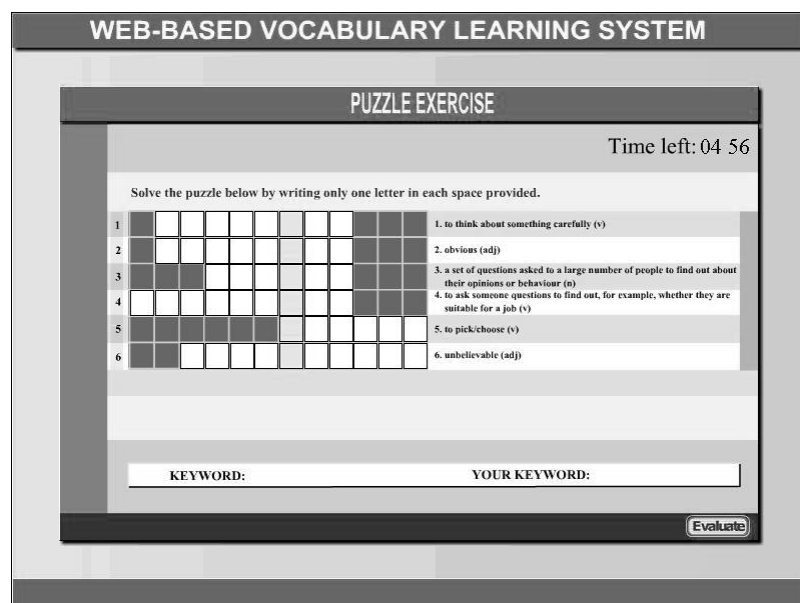
X3 Fourth Revision Application:

- Puzzle (Figure 5)
- Cloze test

## Principles Guiding the Model

As known, Hillman, Willis, and Gunawardena (1994) added a fourth interaction, which is between learner and interface, to the Moore's (1989) identification of interactive relationships regarding on-line learning: learner-content, learner-instructor, and learner-learner. Throughout the implementation, the researchers aimed to obtain ideas of the learners about the tool's content with respect to collecting feedback on visual design, instructional design, usability, and effectiveness of it through "checklists for users" and interviews for deeper understanding of users thoughts. Checklists were the main and most prominent data collection instrument in the study. Through checklists, it was possible to collect information from learners as an aid to better the Web-based material provision. According to Hémard (2006), checklists might be used for tried and tested heuristics closely related to design guidelines since they can provide a convenient and practical method to verify and

*Figure 5. Puzzle—the definitions of the target words are given and learners are made to write the word in the blanks in the correct way. This exercise also checks the spelling. This constitutes the experiment stage of the lesson.*



compare specific aspects of the interaction and interface design. To get learners' perceptions of the tool was highly vital; thus, with their ideas the tool was examined and improved. As stated by Marshall and Rossman (1999), it is not possible to understand human actions without understanding the meaning that the participants attribute to those actions—their thoughts, feelings, beliefs, values, and assumptive worlds; therefore, the checklists and interviews enabled researchers to understand the deeper perspectives of learners about the benefits and difficulties with the use of Web-based tool content with respect to collecting feedback on visual design, instructional design, usability, practicality, and effectiveness of it (p. 57).

Learners were given freedom and autonomy in studying on the Web-based tool. As outlined in the principles of constructivist language learning, they had the freedom of visiting and revising the exercises in each module of WEBVOCLE whenever they wanted. As outlined in the design model and the “spaced revision” technique principles, learners were allowed to practice the vocabulary items at specified intervals. Besides, the time of each revision was decided on keeping in mind the fact that, to ensure 95% retention of words, vocabulary should be practiced 1-10 days after learning the word in class. Therefore, the first contextualized practice was carried out the day after in-class exposition of words, the second revision was one week after that, the third one was two weeks after the first application, and the last one appeared three weeks after the third one. Thus, the spacing of revisions increased before each application.

The context-based vocabulary and other activities were not kept in the Web system. After having been studied by the learners, they were removed and the following ones replaced for the next application. To exemplify, after studying Module A (vocabulary in a story and comprehension exercise with a game-like activity), A1 was made available to the learners one week later with two gap-filling exercises (one drag and drop and

one fill in the blanks by writing exercise) and one choose-the-correct-one exercise. A2 was made available with a multiple-choice and vocabulary-to-definition matching exercise two weeks after the previous one, and finally, A3 was a close test and a puzzle three weeks after A2. The exercises were provided in spaced intervals getting longer each time. That is, learners were not allowed to study the previous weeks' or months' vocabulary because the researchers aimed to see the effects of spaced revision in such intervals.

## **FUTURE TRENDS**

It is obvious that Web-based technologies are becoming inevitable components of effective learning environments and most educators are convinced that they ameliorate the learning process. Additionally, the new pedagogy of learning requires educators to provide their students with opportunities to explore their learning environments rationally, propose solutions to problems, and construct their own knowledge as well as share it with other students. Thus, Web technologies have been a catalyst of the new pedagogy of learning.

In the future, Web technologies will not demolish the classroom instruction or face-to-face interaction among students and the instructor, but those technologies will foster the quality of instruction in several aspects. Since the 21<sup>st</sup> century requires individuals to become proactive members of the knowledge economy, every individual should be able to compete and survive in the international market. As a result, more individuals will be demanding foreign language training that they need all around the world and the quality of training they receive will become a fundamental issue. Consequently, educational institutions and international organizations will be investing more on Web technologies to provide such learning environments. Such attempts will also lead us to better understand the pedagogy of

this new learning paradigm and its implications in foreign language education.

## **CONCLUSION**

In order to evaluate the effectiveness of WEBVOCLE, mainly qualitative data collection techniques were employed. Data were collected from 69 intermediate-level English Language Preparation School students through checklists (54 returned), face-to-face interviews (with eight students), and focus group interviews (three focus group interviews with four students in each group). The results indicated that learners preferred shorter and interesting texts on Web-based materials, and that the interface of any Web-based material should not disturb learners and distract their concentration. Although there is a correlation between aesthetics and usability of an interface, they are assumed to be two different aspects in evaluating effectiveness (Tractinsky & Zimiri, 2006). As revealed by the findings, learners who used WEBVOCLE gave higher priority to usability of an interface design if these two aspects were under consideration. Narrative pictures helped their comprehension of texts; however, they preferred the pictures to be real photographs if possible. Sufficient informative pages and instructions were viewed to be vital on a Web-based learning environment because learners felt themselves alone. A supplementary material with lots of exercises was appreciated by the language learners who were in need of vocabulary practice particularly. When compared to alternative conventional studying materials, this Web-based tool was regarded to be fast and organized. Learners mostly believed that a material which provided spaced revisions was very effective for their retention of newly learned words. Also, they commented that Internet cafes are not suitable places to study on an instructive Web-based material as they do not provide a suitable environment to study.

On the other hand, the quantitative data collected through vocabulary retention tests indicated that for Module A there was a significant difference between the pre- and post-test scores when their frequency of using WEBVOCLE is taken into consideration; for Module B there was not a significant difference between the pre- and post-test scores when their frequency of using WEBVOCLE is taken into consideration; and finally for Module C there was a significant difference between the pre- and post-test scores when their frequency of using WEBVOCLE is taken into consideration.

In addition to these, data collected through attitude questionnaires indicated that there was a significant increase in learners' positive attitudes towards English language vocabulary learning after the implementation of WEBVOCLE, but there was not a significant increase in learners' positive attitudes towards Web-based English language vocabulary learning after the implementation.

The feedback obtained from the learners demonstrates that they benefited from the Web-based vocabulary development tool. Their responses showed that they both enjoyed using the tool as it appealed to a variety of their senses and retained the vocabulary items in their long-term memory. These positive attitudes and learning outcomes can be attributed to the features of the system that are rooted in the constructivist approach and spaced revision of vocabulary items.

The Web-based vocabulary learning system encompassed the characteristics of constructivist learning environments that Jonassen (1994) outlines. In the reading texts and activities, learners were provided with multiple representations of the language. They could hear and read the same vocabulary items in multiple contexts. These multiple representations avoided oversimplification by making the learner aware of the different uses and meanings of the same vocabulary item. As Nation (2001) suggests, vocabulary learning was enhanced as items were used both receptively and productively by the learners.



In addition to these, the system enabled learners to construct knowledge rather than to reproduce it. They could deduce meanings and transfer them to new contexts through authentic tasks. The stories and the characters in the system created a theme-based unity that added continuity to the instructional process. This unity and continuity contributed to establishing a case-based and meaningful learning environment. When analyzed from the learners' perspective, the system enabled learners to engage in thoughtful reflection on their learning experiences. They could monitor their own learning through the immediate feedback provided by the system, set learning targets for themselves, self-assess, and revise their learning targets in light of their self-assessment. Autonomy in pacing and timing the learning gave the learners the opportunity to self-regulate their learning. Since learners worked at their own pace and in an autonomous environment, competition was not a driving force.

In conclusion, it is obvious that the system enabled learners to be actively involved in the learning process and the spaced encounters promoted long-term retention of the newly learned vocabulary.

Theoretical implications supporting WEB-VOCLE demonstrate mainly the constructive approach with the context-based vocabulary teaching and generative theory of multimedia learning. Applying context-based vocabulary teaching in a constructivist learning environment enables knowledge construction that is context and content dependent (Jonassen, 1994); student-centered learning (Gairns & Redman, 1988, as cited in Ünal, 2003); problem solving (Ying, 2001, as cited in Ünal, 2003); and meaningful interaction, critical thinking, and genuine language production. In addition, the design of multimedia-embedded instruction affects the degree to which learners engage in the cognitive processes required for meaningful learning within both the visual and verbal information processing system (Mayer, 2001). Moreover, use of context-

based presentation, visual aids, and a dictionary, which is providing synonyms, pronunciation, and meaning, constitutes elaborative processing that is closely related to encoding variability (DeWinstanley & Bjork, 2002).

## REFERENCES

- Abbey, B. (Ed.). (2000). *Instructional and cognitive impacts of Web-based education* (p. 171). Hershey, PA: Idea Group.
- ACTFL. (1999). *Standards for foreign language learning in the 21st century*. Lawrence, KS: Allen Press. Retrieved August 2007 from <http://www.actfl.org/files/public/execsumm.pdf>
- Adair-Hauck, B., Willingham-McLain, L., & Youngs, B. (1999). Evaluating the integration of technology and second language learning. *CALICO Journal*, 17(2), 269-306.
- Alshwairkh, S.A.N. (2004). *Learning vocabulary through Internet reading: Approaches and attitudes of ESL MBA students*. PhD Dissertation, Indiana University of Pennsylvania, USA.
- Akker, J.J.H., Branch, R., Gustafson, K., Nieveen, N.M., & Plomp, T. (Eds.). (1999). *Design approaches and tools in education and training*. Dordrecht: Kluwer Academic.
- Bahrack, H., Bahrack, L., Bahrack, A., & Bahrack P. (1993). Maintenance of foreign language vocabulary and the spacing effect. *Psychological Science*, 4(5), 316-321.
- Braun, K., & Rubin, D. (1998). The spacing effect depends on an encoding deficit, retrieval, and time in working memory: Evidence from once-presented words. *Memory*, 6(1), 37-65.
- Brooks, J.G., & Brooks, M.G. (1993). *The case for constructivist classroom*. Association for Supervision of Curriculum Development.

- Bygate, M., Skehan, P., & Merrill, S. (2001). *Researching pedagogic tasks second language learning, teaching and testing*. Pearson Education.
- Chastain, K. (1976). *Developing second language skills: Theory to practice*. Chicago: Rand McNally College.
- Chou, C. (2003). Interactivity and interactive functions in Web-based learning systems: A technical framework for designers. *British Journal of Educational Technology*, 34(3), 265.
- Dempster, F. (1987). Time and the production of classroom learning: Discerning implications from basic research. *Educational Psychologist*, 22(1), 1-21.
- Dempster, F. (1991). Synthesis of research on reviews and tests. *Journal of Educational Leadership*, 48(7), 71-76.
- DeWinstanley, P.A., & Bjork, R.A. (2002). Successful lecturing: Presenting information in ways that engage effective processing. In E.F. Halpern & M.D. Hakel (Eds.), *New directions for teaching and learning* (pp. 19-31). San Francisco: Jossey-Bass.
- Deveci, T. (1996). Why and how to teach collocations. *English Teaching Forum*, 34(1).
- Ertmer, P.A., & Newby, T.J. (1993). Behaviorism, cognitivism, and constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 6(4), 50-72.
- Fosnot, C. (1992). Constructing constructivism. In T.M. Duffy & D.H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 167-176). Hillsdale, NJ: Lawrence Erlbaum.
- Fosnot, C. (1996). Constructivism: A psychological theory of learning. In C. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (pp. 8-33). New York: Teachers College Press.
- Foster, V.J. (1996). *Investigating visual art as a viable method for teaching vocabulary to First Grade English as a Second Language students*. PhD Dissertation, Illinois State University, USA.
- Groot, P. (2000). Computer assisted second language vocabulary acquisition. *Language Learning & Technology*, 4(1), 60-81.
- Hatch, E., & Brown, C. (1995). *Vocabulary, semantics, and language education*. Cambridge: Cambridge University Press.
- Hémard, D. (2006). Design issues related to the evaluation of learner—computer interaction in a Web-based environment: Activities v. tasks. *Computer Assisted Language Learning*, 19(2), 261-276.
- Hillman, D.C, Willis, D.J., & Gunawardena, C.N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education*, 8(2), 30-42.
- Jonassen, D.H. (1994). Thinking technology: Towards a constructivist design model. *Educational Technology*, 3(4), 34-37.
- Jonassen, D.H. (1999). Designing constructivist learning environments. In C. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm of instructional theory* (vol. II, pp. 215-239). Mahwah, NJ: Lawrence Erlbaum.
- Johnson, A., & Heffernan, N. (2006). The short readings project: A CALL reading activity utilizing vocabulary recycling. *Computer Assisted Language Learning*, 19(1), 63-77.
- Kaufman, D. (2004). Constructivist issue in language learning and teaching. *Annual Review of Applied Linguistics*, 24, 303-319.
- Kolich, E.M. (1991). Effects of computer-assisted vocabulary training on word knowledge. *Journal of Educational Research*, 84(3), 177-182.

- Kung, S.C., & Chuo, T.W. (2002). Students' perceptions of English learning through ESL/EFL Web sites. *Teaching English as a Second or Foreign Language*, 6(1A).
- Kuper, K., & Allan, W.S. (2004). *An introduction to English language: Word, sound and sentence*. New York: Macmillan.
- Labrie, G. (2000). A French vocabulary tutor for the Web. *Calico Journal*, 17(3), 475-500.
- Lewis, M. (1993). *The lexical approach*. London: Language Teaching.
- Lewis, M. (2000). Learning in the lexical approach. In M. Lewis (ed.), *Teaching collocation: Further developments in the lexical approach* (pp. 155-184). London: Language Teaching.
- Ma, Q., & Kelly, P. (2006). Computer assisted vocabulary learning: Design and evaluation. *Computer Assisted Language Learning*, 19(1), 15-45.
- Marshall, C., & Rossman, G.B. (1999). *Designing qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- Mayer, R.E. (2001). *Multimedia learning*. New York: Cambridge University Press.
- Moore, M.G. (1989). Three types of interaction. *American Journal of Distance Education*, 3(2), 1-6.
- Moshe, N. (1990). The acquisition and retention of knowledge: Exploring mutual benefits to memory research and the educational setting. *Applied Cognitive Psychology*, 4, 295-320.
- Nation, I.S.P. (1990). *Teaching and learning vocabulary*. New York: Newbury House.
- Nation, I.S.P. (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press.
- Perkins, D. (1992). *Smart schools: From training memories to educating minds*. New York: The Free Press.
- Piaget, J. (1954). *Intelligence and affectivity*. Palo Alto, CA: Annual Reviews.
- Piaget, J. (1970). *Main trends in psychology*. London: George Allen & Unwin.
- Piaget, J., & Inhelder, B. (1971). *The child's conception of space* (F.J. Langdon & J.L. Lunzer, trans.). London : Routledge and Kegan Paul.
- Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (2003). Cognitive load in reading a foreign language text with multimedia aids and the influence of verbal and spatial abilities. *Computers in Human Behavior*, 19(2), 221-243.
- Pusack, J.P., & Otto, S. (1997). Taking control of multimedia. In M.D. Bush & R.M. Terry (Eds.), *Technology-enhanced language learning* (pp.1-46). Lincolnwood, IL: National Textbook Company.
- Reynolds, D., Sammons, P., Stoll, L., Barber, M., & Hillman, J. (1996). School effectiveness and school improvement in the United Kingdom. *School Effectiveness and School Improvement*, 7, 133-158.
- Ruschoff, B., & Ritter, M. (2001). Technology-enhanced language learning: Construction of knowledge and template-based learning in the foreign language classroom. *Computer Assisted Language Learning*, 14(3-4), 219-232.
- Russo, R., & Mammarella, N. (2002). Spacing effects in recognition memory: When meaning matters. *European Journal of Cognitive Psychology*, 14(1), 49-59.
- Stephenson, J. (2002). Characterization of multisensory environments: Why do teachers use them? *Journal of Applied Research in Intellectual Disabilities*, 15(1), 73-90.
- Tchudi, S., & Mitchell, D. (1989). *Explorations in the teaching of English*. New York: Harper Collins.

Tozcu, A., & Coady, J. (2004). Successful learning of frequent vocabulary through CALL also benefits reading comprehension and speed. *Computer Assisted Language Learning*, 17(5), 473-495.

Tractinsky, N., & Zimiri, D. (2006). Exploring attributes of skins as potential antecedents of emotion in HCI. In P. Fishwick (Ed.), *Aesthetic computing* (pp. 405-422). Cambridge, MA: MIT Press.

Tsou, W., Wang, W., & Li, H. (2000). A computer-assisted English abstract words learning environment on the web. *Proceedings of the 8th International Conference on Computers in Education/ International Conference on Computer-Assisted Instruction 2000 (ICCE/ICCAI 2000)* Nov. 21-24, 2000. Volume 1, pp. 379-382. Taipei, Taiwan, R.O.C.

Ünal, M. (2003). *The contribution of context to vocabulary teaching*. Master's Thesis, Selçuk Üniversitesi, Turkey.

Vermette, P., Foote, C., Bird, C., Mesibov, D., Harris-Ewing, S., & Battaglia, C. (2001). Understanding constructivism(s): A primer for parents and school board members. *Education*, 122(1), 87-93.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Waring, R. (2004). How to successfully use flashcards: In defense of learning words in word pairs. *The Internet TESL Journal*, (February). Retrieved June 12, 2007, from <http://iteslj.org/links/TESL/Articles/Vocabulary/>

Wiley, D.A. (2002). Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In D.A. Wiley (Ed.), *The instructional use of learning objects*. Retrieved August 2007 from <http://www.reusability.org/read/>

Yang, P.J. (1998). Networked multimedia and foreign language education. *Calico Journal*, 15(1-3), 75-88.

Yip, F.W.M., & Kwan, A.C.M. (2006). Online vocabulary games as a tool for teaching and learning English vocabulary. *Educational Media International*, 43(3), 233-249.

Young, S.C. (2003). Integrating ICT into second language education in a vocational high school. *Journal of Computer Assisted Learning*, 19(4), 447-461.

## KEY TERMS

**Autonomous Learners:** Learners who can set their learning goals and strategies, and are able to monitor and regulate their learning process in accordance with their learning goals and the learning context.

**Constructivism:** An epistemological approach where learning occurs through cognitive processing of environmental interactions and forming corresponding constructions of mental structures to make sense of them. It focuses on learners' interaction with the real world to gain knowledge, and truths or facts change for each individual in that everyone interprets the gained knowledge differently. Learners search for knowledge and create their own meaning through experiences.

**Forgetting Curve:** Illustrates the decline of memory retention in time. In WEBVOCLE the effect of frequent revisions on memory retention was under consideration.

**Learner-Centeredness:** Ascribes to each learner a sense of responsibility for his or her own learning by enabling a constructivist approach with the assumption that deep learning occurs when a learner is actively engaged in the construction of knowledge for himself.

**Interactive Learning Environment:** Concept used in this chapter to mean the Web-based environment (WEBVOCLE) for educational purposes that supported learning through the interaction with the computer (human-computer interactivity).

**Multimedia-Supported Learning Environment:** Offers the experience of listening, looking, and doing in a computer-mediated setting. The Web-based vocabulary learning system, WEBVOCLE, benefited from the advantages of audio and visual multimedia, and applied some of the elements of multimedia such as use of images, animation, sound, and text.

**Observe-Hypothesize-Experiment Cycle:** Lewis (1993) proposes a model that comprises the cycle Observe-Hypothesize-Experiment (as opposed to the traditional Present-Practice-Produce paradigm) with the lexicon and the generative power of words at its core.

**Spaced Revision:** A learning technique in which revisions of the same vocabulary item are provided with increasing intervals to allow one to remember new information for a long time. Throughout the application of this technique, the revisions of vocabulary items are done not in a massed way but through spaced intervals.

**Vocabulary Retention:** Refers to keeping vocabulary in long-term memory and retrieving it—for meaningful use in appropriate contexts.

**Web-Based Instruction (WBI):** The application of Web-based technologies for the purposes of instruction. A method of teaching and learning supported by the attributes and resources of the Internet.