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An attempt to modernise vocabulary teaching through the use of a user-oriented web-based learning management system

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Abstract

According to research in applied linguistics students approach and negotiate language learning through a series of specific activities, both technical and procedural, which are known as learning strategies. It is obvious that these strategies are strongly related to their learning style. At the same time the prevailing scholarly view places great emphasis on vocabulary, which is now considered to be one of the fundamental areas of language. The recognition of the importance of vocabulary means that improving its teaching methods is essential. Bearing in mind the fact that the number of words that students must learn is in reverse proportion to the available teaching time, it is necessary to seek more effective methods for teaching vocabulary. The use of Information and Communications Technologies (ICT) now appears to be a promising solution. This study describes the structure of one such web-based system and proposes ways of using it that respond to individual learner characteristics. Its design enables it to predict the personal preferences, abilities and needs of each learner and to adapt the learning material on offer appropriately. It can evaluate learners’ performance and, finally, guide them with the goal of their continuous improvement; such aims are very difficult to achieve through the grammar-translation method of language teaching.

Keywords: vocabulary teaching, learning style, learning strategies, ICT

1. Introduction

Vocabulary has traditionally been a marginalised branch of language teaching, as in the past its role was seen as being complementary and auxiliary to the teaching of grammar. By contrast, for many centuries grammar was considered to be the main core of language teaching and its learning was the primary and most important aim (Lewis 1993 & 1997, O’Malley & Chamot 1990, Paradia & Mitsis 2011, Schmitt 2000). Vocabulary, as a part of the language system, does not display the strict systematic properties that govern grammar, as a large portion of the relationships created within it are the result of conventions and not general rules. This fact was, perhaps, the basic reason for its marginalisation in traditional language teaching approaches (Lewis, 1997). One only needs to recall the arbitrary relationship between form and meaning, of which Saussure (1916) first spoke, and note that every word is, within the context of the language code, a particular situation in which the speaker is obliged to know the individual characteristics of each word and the special network of relations that it creates with the other words.

The very rapid development of linguistics, however, has posed a series of questions that have gradually led to uncovering the complex structure and vast significance of vocabulary. From this point on, vocabulary gradually started to emerge as a core area of language teaching.

More specifically, the contemporary scientific perspective lays increased emphasis on vocabulary, which is considered, along with grammar, as the foundation of language. It accepts, in other words, that vocabulary is one of the core areas of language and that, along with grammar, it organises lexical structures (Lewis, 1993; Mitsis, 2004). Words are indeed the means by which we express whatever comes to our attention. It is through words that we characterise, categorise and comprehend objects, actions, activities, ideas and feelings and it is obvious that without them we would not be able to
communicate. In other words, vocabulary is a basic precondition for an effective use of the language code (Mitsis, 1998; 2004).

This is why one of the main goals of modern language curricula and textbooks, in both first and second language teaching, is to produce the necessary preconditions so that students can acquire as broad, functional and useful a vocabulary as possible as the basis for achieving effective communication. It is not necessary to underline here how crucial vocabulary is in the teaching of a second or foreign language since students in this case usually have very limited or insufficient knowledge of it.

2. The present-day approach to vocabulary and the need renewed strategies for vocabulary teaching

Vocabulary teaching, as it takes place today within the context of learning a first or a second/foreign language, does not always fulfil the goals aspired to, and this is attributable to two main causes. Firstly, because it is not compatible with the complex organisation and nature of the personal or internal vocabulary of each speaker, defined by contemporary linguistics as the mental lexicon (Aitchison 1994, Bakakou-Orphanou, 2005). Secondly, and following on from this, given today's prevailing conditions in the Greek educational system the adoption of a more effective teaching approach is not made easier (Paradia & Mitsis, 2011).

In relation to the first cause, contemporary research has revealed that the mental lexicon is not a list of words, as was believed in the past, but rather a complex web or network within which words are grouped in many ways and among them develop an infinite number of links of various types and degrees (Aitchison, 1994; Mitsis, 2009; Bakakou-Orphanou, 2005; Paradia & Mitsis, 2011).

Given these conditions, lexical knowledge is defined by current research as a complex phenomenon. Such knowledge involves command of a set of characteristics and peculiarities for each word, such as knowledge of its pronunciation and written form, the association between its meaning and its form, an understanding of its meaning on the basis of its linguistic and extralinguistic context, knowledge of synonyms, antonyms and hypernyms, etc. (Nation, 2001). Moreover, knowledge of a particular word is not acquired automatically but passes through various stages and levels, some of which, in order to be acquired, presuppose sufficient knowledge of the corresponding levels and subsystems of the language. This means that:

the various speakers of a language may know the same word without, however, all having assimilated it in the same way and to the same degree

sufficient knowledge of a particular word is not achieved automatically but gradually and each time in combination with the assimilation of other prerequisite or parallel knowledge (Mitsis, 2009).

As such, sufficient knowledge of a word is achieved after multiple and deliberate encounters with it. This means that vocabulary learning must be approached methodically and in accordance with the principles and findings of applied linguistics (Nation, 2001) and not through superficial processes.

Leaving aside the limitations of traditional approaches and methodologies,

the second important reason for the ineffectiveness of vocabulary teaching is the fact that the required number of words that learners must assimilate in order to communicate
effectively is in reverse proportion to the time that the teacher has available for this. As such, teaching must turn to new and more effective ways through which students can learn words, not only within but also outside of the classroom (Paradia & Mitsis, 2011).

The most obvious weakness of the traditional method (of the grammar-translation method), however, is that it cannot be personalised, that is adapted to the individual characteristics of each learner. This weakness significantly limits the quantity of the teaching material and may also be unfair to those learners whose individual characteristics do no respond to the demands of the specific teaching method chosen by the instructor.

The existence of a problem becomes apparent here, a problem that it seems cannot be sufficiently overcome. It is to this purpose that the potentials of ICT can be used within the context of language teaching (Koutsogiannis, 2007; Paradia et al., 2004 and 2005), in particular the use of a vocabulary teaching system. The particular system examined here has been designed and developed so as to be able to assess the particular qualities, abilities and needs of individual learners and, therefore, to adapt the language material offered accordingly, something that is very difficult to achieve with current teaching methods (Kritikou et al., 2008 and 2010).

The use, then, of a modern method of e-teaching forms the core of this study. Both the theoretical framework of this system, as well as its structure and operation will be described below in detail.

3. Theoretical basis
According to Mitsis (1998), Nation (2001), Schmitt & McCarthy (1997) each student approaches the linguistic material through particular ways and techniques, something that necessitates, as noted above, the search for, and use of, personalised teaching methods. These specific approaches to the knowledge offered are clearly related to the basic features of each learner’s personality, amongst which their learning style has a dominant role. The fixed manner in which each student responds to the learning environment and interacts with the material taught, such as the use of senses (e.g. visual and auditory), focusing of attention on the whole or parts of a unit, the use of intuition or a specific reasoning process, etc. define the learning style (Cohen, 2003; Felder & Henriques, 1995; Mitsis, 1998; Oxford, 2003).

The learning style as a characteristic of the individual’s personality and an approach to the teaching material does not appear autonomously during the language learning process, but is negotiated, or, rather, its negotiation is attempted by learners through a series of individual techniques and processes known as learning strategies.

Learning strategies are generally defined as a series of deliberate techniques, actions and special ways of approaching the teaching material (e.g. a combination of the word being taught with a respective picture, imitation, presentation of words with a definition, thematic grouping of words, of synonyms, antonyms and hypernyms, etc.) which aim at a faster and more effective achievement of the teaching goals (Chamot, 2005; Cohen, 2003; Mitsis, 1998; Nation, 2001; Schmitt & McCarthy, 1997). For learning strategies to be effective, however, they must be compatible with the individual characteristics and learning style of each student (Paradia, 2010).

These learning strategies are not realised autonomously in the classroom but rather appear in the form of specific teaching strategies that relate to the content and goals of a particular teaching unit in a given class.
As such, following the classification of Mariani (1996), we would say that the factors involved in the learning process and, specifically, vocabulary teaching of a second or foreign language, are the following (Figure 1):

**Figure 1. The factors involved in the learning process**

It is clear that these factors are not only closely related to each other but they overlap to such a degree that the teaching process, in order to be effective, must correlate them and approach them as a whole (Cohen, 2003; Mariani, 1996). This means that a very simple vocabulary teaching activity must be the product of the materialisation or application of a corresponding strategy, which in turn is compatible with the student’s learning style. One can understand however that a similar form of personalised teaching, which in the classroom would simultaneously cover every form of teaching style, is impossible as the available teaching time is insufficient for learning the required vocabulary. Given that the time is insufficient, then, what is required is for students to exercise systematically using strategies that will enable them on their own to complete and improve the vocabulary that they have already acquired (Nation, 2001; Schmitt & McCarthy, 1997). The fact, however, that each student responds to the vocabulary material in a personalised way means that they should not use just any strategy but only those that respond to and complement their own learning style.

The difficulties, however, of such an effort, which requires almost the complete personalisation of teaching, are clear despite the fact that such a process is today considered essential, both for the mother tongue as well as for a second or foreign language. As already mentioned, this precondition cannot be fully satisfied by vocabulary teaching in the way in which it is carried out in the Greek educational system. Other forms of intervention are therefore required and, as mentioned above, this is where the use of new technologies arises as a potential and pedagogically effective solution (Kritikou et al., 2006). With the development of new multimedia technologies researchers have turned their attention to the question of how these ICTs can be used appropriately so as to support the teaching process in optimal ways and achieve significant in-depth learning (Samara, 2007;
Systematic research efforts by specialists over the past two decades have already led to the creation of suitable electronic environments with the goal of assisting learning through personalised forms of teaching (Alomyan, 2004; Brusilovsky, 2001; Dagger, 2003; Dolog et al., 2004; Juvina & van Oostendorp, 2004; Ong & Hawryszkiewycz, 2003).

Following these developments, a web-based system for vocabulary teaching was designed for language learning, which, when supplied with the appropriate data, is able to adapt the vocabulary being taught to the learning style of each student/user, evaluate his or her performance and, interactively, offer new vocabulary, suggest activities and, in general, guide the student with the goal of his or her continuous improvement, always within the context of their personal characteristics and abilities (Kritikou et al., 2008 and 2010).

In the following section a detailed presentation of the structure and functions of this mechanism is given.

### 4. Features and operation of the web-based learning management system

Once the vocabulary e-teaching system described above is supplied with the required structure as well as the information from an initial questionnaire and the subsequent evaluation of the user’s behaviour within the system, it places the user within a specific group of individuals/users with a common learning style. The system then guides the members of the group in the learning of the selected vocabulary through corresponding texts, activities and strategies that are fully adapted to their learning style.

More analytically, once the user has entered the system he or she must answer a series of questions which the system will use to create their initial profile and then place them in a group of individuals with a common learning style and knowledge level. The questionnaires, the basic goal of which is to diagnose the learning style and knowledge level, are based on respective classifications that correlate with teaching practice and classroom reality (Felder & Henriques, 1995; Mariani, 1996; Mitsis, 1998; Oxford, 2003).

Once the user has been placed in a specific group (e.g. visual, auditory, kinaesthetic, global, analytic etc learners), he or she comes into contact with the teaching material and follows the teaching course proposed by the system. From this point on, the teaching material begins to be adapted to the user’s individual characteristics and learning pace. The teaching material is thus also graded according to levels of difficulty and the system can suggest, according to level, learning strategies that match each group’s learning style. By monitoring the learning pace, the quantity of material and the specific preferences of each learning style, the system can adapt the demands and the learning process as a whole to the abilities and individual characteristics of each user, providing a form of personalised teaching (Kritikou, 2008 and 2010).

Briefly, the structure of the system comprises four basic components, the operation and interaction of which is what makes the whole learning process effective (Alomyan, 2004; Garzotto & Cristea, 2004; Kritikou, 2008 and 2010; Zakaria, 2003). These components are the following, as presented in Figure 2:

**User Profile Model**: The User Profile Model stores all data relating to the user. It stores the history of personal information, individual preferences and details relating to the user’s performance. This information allows the system to adapt the teaching material to the data and learning style of each user (or group), thus creating forms of personalised teaching.
adapted to the characteristics of a specific group. As mentioned, a series of simple questions answered by users at the beginning of the first lesson (such as the ones included in the application example of the present study) provides an initial assessment of their learning style and, in particular, how they prefer the material to be structured and offered to them. This also allows evaluation of the conditions that make them feel comfortable and secure during the learning process.

With this data, then, the system creates an initial profile for each user and places them within a particular group. By monitoring their behaviour it can subsequently place users in a different group if the relevant data change. The User Profile Model is of particular importance for the system as it means it is easily adaptable and student-centred, according to users’ individual characteristics, thus providing them with a basic incentive for participating and working creatively.

**Content Model:** The Content Model Component stores data relating to the teaching material to be offered to the users. This is where teaching material and teaching units are stored and, whenever requested, this component provides the appropriate information to the User Interface Component. This component uses the instructions sent to it by the User Profile Model for the preferences of the users in each group.

**User Interface:** The User Interface Component uses the material it receives from the User Profile Model, where user preferences are stored, and from the Content Model Component, where the teaching material units are stored, and adapts this material according to the profile of each user. In short, this component gives the teaching material the final form with which it is to be presented to the user.

The system architecture is rounded off with the **User Monitoring Component.** Through a corresponding mechanism, this component monitors user behaviour as users surf the e-learning system and identifies their interests as well as weaknesses and gaps in their knowledge. The data gathered by the User Monitoring Component are transferred to the User Profile Model, in order to improve the system’s picture of a user’s profile and to adapt the teaching process accordingly.

**Figure 2. The Vocabulary Learning System and its components**
To sum up the above, the system architecture comprises four basis areas which, through a smooth collaboration, make the system easy to use, interesting and attractive for the user and, above all, adaptable to the individual characteristics, preferences and learning style of each user group. This is achieved through the use of cognition mechanisms incorporating the Bayesian Networks concepts, in order to take into consideration users’ past preferences and their current feedback. Two indicative scenarios of the system were examined, in order to showcase its effectiveness (Kritikou et al., 2010).

5. Application example

We have already mentioned that the main feature of the vocabulary e-teaching system is the development of interactive communication with the users, a necessary precondition for providing them with information and supplying the system with all the data that would enable it to adapt the teaching material offered to user needs and preferences.

There follows an example application, wherein the user who desires to be integrated into the system is user X. We will follow user X’s course progress in the learning of Greek as a second language in detail. During his first encounter with the system, user X completes two types of questionnaires: a) a questionnaire/test on his language level, and b) a questionnaire to diagnose his learning style.

To assess the level of language learning we have used the well-known classification tests that have been in use for several years now, based on the principles of applied linguistics (Edge, 1993; Harrison, 1983; Heaton, 1990).

The e-teaching system then introduces a questionnaire to diagnose the user’s learning style. On the basis of this the user will then be placed in a corresponding group of students who obviously all have the same knowledge level of the language. These questionnaires usually follow one of the various categorisations of learning style (Banner & Rayner, 2000; Felder & Henriques, 1995; Gill, 2005; Mariani, 2009; Soloman & Felder, 2009) and usually have the following format:

*You learn better:*
When you see something
When you hear something
When you get to grips with something

*You remember some words better:*
When you read them many times
When you write them many times
When you use them many times

*When you want to relax you:*
Read something
Listen to music or something else
Do something practical (e.g. exercise, gardening)

*You usually remember:*
Faces but not names
Names but not faces
Facts but not names and faces

*You understand a text better:*
When it is accompanied by pictures, tables, diagrams, etc.
When someone else reads it out
When you combine it with some form of activity

To remember a word you:
- Colour or underline it
- Read it out loud many times
- Associate it with objects, phenomena, etc.
- Associate it with words of the same semantic field, synonyms or antonyms

Once the questionnaire has been completed the system makes an initial assessment and determines that: a) user X has very little knowledge of Greek, and b) he approaches this knowledge primarily visually. As such, it places him at beginners’ level and in a group of visual types.

From this point on, user X begins to communicate with the system, receives related study material and participates in the activities with which it supplies him.

According to current scholarly thinking, visual types have the following general characteristics:

- They learn visually and, as such, they think with images and acquire and store knowledge using images.
- They assimilate the teaching material better when it is accompanied by images, maps, drawings, tables, diagrams, DVDs and films.
- They use colour or underline words to highlight the basic vocabulary in a text.
- They study in quiet places, avoiding sounds and noise.
- They prefer illustrated books and general texts that are combined with visual indicators.
- They have difficulty assimilating information that is given to them only orally. In order to understand it, they take notes or draw up tables, diagrams, lists, etc. (Banner & Rayner, 2000; Felder & Henriques, 1995; Gill, 2005; Oxford, 2003).

Taking the general characteristics of visual types into account, the system provides the group with the set Greek language vocabulary in forms and ways that utilise strategies conforming to this particular learning style. More specifically this vocabulary, as generally happens with the language phenomenon, extends in two directions, the paradigmatic and the syntagmatic axes. Consequently, vocabulary must be taught through activities that creatively produce discourse/text. These provide students with exercises in the various uses and meanings that words have in syntagmatic axis, with the parallel aim of enriching and further systematizing paradigmatic relations (Mitsis, 2004; Paradia & Mitsis, 2011). As such, the teaching material and the strategies proposed by the system aim to reinforce the paradigmatic as well as the syntagmatic dimension of vocabulary, that is, the use of words.

On the paradigmatic dimension of vocabulary we could say that words are not stored nor are they classified in the mental lexicon as isolated elements, but they are correlated and grouped in various ways so that one word is placed in many groups, according to how broad the individual’s vocabulary is. This correlation between words and the creation of similar sets that are known as lexical fields or networks strengthens the processes of association and contributes to their speedier and more effective recollection (Mitsis, 2004).

For the learning of new words and, consequently, their grouping and correlation on a paradigmatic level, the system uses a series of strategies that are compatible with the
learning style of visual types, such as:

- Presentation in written form of words/semantic fields (synonyms, antonyms, hyponyms, etc.).
- Visualisation and schematic presentation of the various relationships that are created within the lexical fields.
- Underlining, colouring and, in general, highlighting in any way of the basic words per lexical field.
- Linking of words wherever this is possible with corresponding images, sketches or objects.
- Presentation in a table of the semantic characteristics of a word or of more than one word in a comparative manner.
- Creation of etymological families of words and their schematic presentation.
- Use of the image of an object with the simultaneous presentation of its parts (e.g. parts of the body or of the tree, areas of the house, etc.).
- Schematic juxtaposition of a series of words, which give a scale of degrees of two opposing meanings (e.g. frozen, cold, refreshing; lukewarm, hot, burning).
- Creation of thematic lexical fields and their schematic presentation (e.g. vocabulary relating to the theatre, school, sports, etc.).

In addition to their participation in various groups with a paradigmatic dimension, words can also create connotations, that is, they can appear along with certain other words in the syntagmatic dimension of language and thus acquire, within this context, a specific meaning (Mitsis, 2004).

The following are just some of the strategies deployed by the system in the learning of syntagmatic lexical relations:

- Examples or texts to be studied are always given in written form accompanied, as far as possible, by related visual material, such as pictures, maps, tables, diagrams, etc.
- During encounters with oral discourse, visual indications are given and the use of written notes is requested.
- Colouring, underlining and highlighting of the basic words or key words in a text.
- Writing new words on screen, in tables, use of flashcards, etc.
- Schematic rendering of the different meanings of words with multiple meanings, giving examples.
- Linking typical phrases or words (e.g. hello, congratulations, sorry, etc.) with corresponding instances of communication and their simultaneous representation with visual indicators.
- Linking idioms with corresponding meanings through the use of appropriate texts that are accompanied, as far as possible, with related visual material.
- Learning common expressions (e.g. close relative, broad smile) and phrasal compounds (e.g. civil engineer, playground) through texts in which they appear.
naturally.

- Presentation of a hypothesis for the possible meaning of a word on the basis of its context as well as other accompanying visual elements.
- Completing language exercises that are always given in written form.
- Provision of visualised information for the study and understanding of a specific subject (e.g. the ecosystem) for the faster and easier learning of the related vocabulary (Gairns & Redman, 1995; Mitsis, 2004; Wright & Haleem, 1992).

The system, as it monitors the development and performance of the students, ascertains after a sufficient period of time that user X has worked systematically, that he has fully covered the demands of his teaching level and, can therefore move directly to the next one.

From this point on, user X will start to receive the material for the next level, again using strategies compatible with his learning style.

From the above, it can be seen that the vocabulary e-teaching system has the following features: a) it is personalised, b) it is adaptable to the individual needs of the user, c) it is interactive, and d) it varies in the upgrading and presentation of the teaching material. It would be very difficult to achieve these features through the usual teaching process without the use and contribution of new technologies (Kritikou et al., 2008 and 2010).

6. Observations and proposals

This study has proposed the use of a vocabulary e-teaching system which, as it has been designed, can be adapted to the individual needs of each user and, above all, to their learning style, providing a strong incentive for the learning of a second language. This development, according to the description given above, contributes decisively to saving on time and effort. Moreover, the entire process appears to respond to the needs of vocabulary teaching as these are established today, as it speeds up the learning process and makes it more dynamic and therefore more effective.

Nonetheless, it should be noted that the use of a teaching environment that utilises modern pedagogical and educational thinking and the potential of educational technology in a constructive way must fulfil certain basic preconditions. These include the further familiarising of students with new technologies (web-based environments, collaborative tools, services, etc.) and, especially, acquiring a more positive perspective on the contribution of these means to the acquisition of language skills (Godwin-Jones, 2008).

Summing up, it can be said that vocabulary learning through an e-teaching system is an innovative teaching proposal that could lead to a more general attempt to revise traditional teaching practices and to shift from word-centred teaching methods to the discovery and assimilation of knowledge with the help of new technologies (Kyriazis & Bakoyiannis, 2003).

The above proposal has as its starting point the fact that recent developments in linguistics have enabled us to have a fuller and more objective knowledge of the formation, operation, and significance of vocabulary. At the same time, however, they have raised a series of questions and issues, primarily in terms of teaching, such as the lack of teaching time and the inability to adapt teaching to students’ individual needs (Mitsis, 2004; Nation, 2001). This proposal aims to provide relevant answers.

It appears that these and many other such issues can be effectively overcome by the
targeted use of ICTs in teaching, not only in terms of quantity but also in terms of quality. This is the direction our own proposal has incorporated based on the concept that using an appropriately designed e-learning system can successfully serve the needs of vocabulary teaching, in particular for a second or foreign language.

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