Computerized lexis-based instruction in EFL classrooms: Using multi-purpose LexisBOARD to teach L2 vocabulary

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Abstract

Lexis-based views of second or foreign language (L2) teaching place prime importance on the teaching of conventionalized multi-word lexical items, or unanalyzed chunks, as a useful mechanism for fostering learners' creative production of forms and their subsequent development of L2 competence. This pretest/posttest quasi-experimental study probed the use of teacher-designed multi-purpose instructional lexis software, dubbed LexisBOARD, on L2 learners' vocabulary achievement in an Iranian EFL (English as a foreign language) context. A cohort of 50 Iranian junior-high-school students participated in the main instructional phase of the study. Instruction on L2 lexical items (e.g., concordances, polywords, or formulaic sequences) was mainly given to the experimental group using LexisBOARD, which was designed to be user-friendly and attuned to learners' communicative and curricular needs. LexisBOARD offered further practice or feedback affordances through engaging students in lexical exercises (with word partnerships and collocations) for each unit and several quizzes for self-assessment. The control group was only taught using their mainstream EFL textbooks focusing on grammatical rules, discrete vocabulary items with fixed meanings, and reading texts, without any use of corpus-based activities. The results of the groups' vocabulary test scores indicate that the lexis group significantly outperformed the control group, pointing to the superiority of practicing and learning L2 vocabulary when lexical items are seen in larger, more holistic ways and, especially, when engaging and experimenting with lexis is scaffolded through computer affordances.

Keywords: lexis-based language teaching, grammaticalized lexis, concordancers, LexisBOARD

1 Introduction

The notion of "lexis" refers not only to single vocabulary items but also to lexical combinations which are stored in language learners' mental lexicons as unanalyzed chunks

which, according to Lewis (1993), form the basis of language. Language production is then largely a matter of piecing together these ready-made units appropriate for use in a particular language situation (Nattinger, 1980). These formulaic chunks are often fully fixed in terms of their lexical constituents, and, in many cases, the meaning of the whole is completely different from the sum of the meanings of its parts (Side, 1990). Other concepts being used to refer to unanalyzed wholes are 'lexical phrases' (Nattinger & DeCarrico, 1992), "speech formulae" (Peters, 1983), and "lexicalized stems" (Pawley & Syder, 1983). To usage-based theorists, lexis is a point of departure for the emergent language learning process. From this theoretical perspective, lexis-based language learning involves the automatization of frequently occurring sequences of linguistic elements which, through language experience and frequency of use, have now gained the status of grammaticalized linguistic constructions (Tomasello, 2000; Dörnyei, 2009). This lexis-oriented grammaticalization process, according to Tomasello (2000), has been at work diachronically at the macro level, whereby grammatical structures of modern languages phylogenetically emerged from functional language use, and also synchronically at the micro level of a child (or L2 learner) mastering the syntactic structure of a language. In essence, language "consists of grammaticalized lexis, not lexicalized grammar" (Lewis, 1993: 89).

The centrality of lexis to meaning-making attempts and thus to communicative ability in item-based language learning conveys a greatly diminished role for sentence grammar. Nonetheless, the notion that every word has its own grammar suggests that any language teaching approach based on the centrality of lexis is in many ways more grammatical than the traditional grammar-based syllabuses (Lewis, 1993). Lewis bases his Lexical Approach on this notion and further argues that "without grammar little can be conveyed; without vocabulary nothing can be conveyed" (Wilkins, 1972: 111). In a similar vein, Larsen-Freeman (1991) argues that grammar is just one of the several dimensions of language that deals with language forms, while such forms are literally meaningless without a second dimension, namely, semantics, which comes about through lexis. This lexis-based view of language learning is basically a radical departure from traditional grammar-based views that grammatical structures originate in the grammar component of the human genome or that language learners' early utterances are organized around system-wide syntactic schemas (Tomasello, 2000), and thus awaits further theorizing and research. This perceived need for more focused research on the application of lexis-based theories becomes more urgent in the modern technology era when teachers and learners are witness to a huge proliferation of corpus-based lexis parsing (or processing) software applications that can assist them in teaching or learning L2 collocations or formulaic sequences. Little research has, however, focused on the systematic integration of the teaching methodology endorsed by the Lexical Approach and the design or application of compatible computer software programs in L2 classrooms. Further research is therefore needed to explore a methodological focus on formulaic chunks using multicomponential computer-assisted lexis platforms. This issue is addressed by the current study within an EFL classroom in Iran.

One of the most important skills in second language acquisition (SLA) is learning vocabulary, storing it and recalling it when needed. Although EFL textbooks for Iranian high schools have recently been revised, the way L2 vocabulary is presented or re-activated is still problematic (at least) from the vantage-point of the Lexical Approach motivating this study. In these textbooks, vocabulary is largely treated as a stock of individual words with fixed meanings rather than concurring or recurring lexicalized chunks, items, or formulae

supposed to underlie learners' grammaticalization processes. Further, sentence grammar (e.g., substitution or transformational drills) still receives considerable emphasis, whereas L2 collocations, gambits, cognates, or other multi-word lexical strings are paid almost no principled attention throughout the coursebooks. This study was thus an attempt to put Lewis's lexical view to the test in an Iranian EFL context and examine its applicability and utility using a teacher-designed multi-purpose software application.

The current study explores whether it makes any substantial difference if 'grammaticalized lexis' (rather than 'lexicalized grammar' as is the case in the current EFL situation) becomes the kernel building-block of L2 instruction. Another major concern of the study was probing the applicability of computers for easier and more productive delivery of the lexis-based vocabulary instruction. The modern technological era has witnessed the advent of different databases or corpora that have proved useful in the design and use of concordancers and other software applications for L2 instruction and learning. Therefore, it is very important for the lexis-oriented strand of L2 research and pedagogy to investigate the utility or application of technological affordances for skills development in L2 classrooms, leading to the following research question:

> Does the use of lexis-based vocabulary instruction (delivered through teacher-designed LexisBOARD) have any significant effect upon Iranian junior-high-school students' L2 vocabulary achievement? If so, is it more effective than the conventional ("word-based") teaching approach?

2   Theoretical Background

The role of vocabulary, as one of the subsystems of language, has often been downplayed in language teaching approaches during recent decades (Nunan, 2003). Traditionally, language was mainly assumed as a syntactic rule-governed process with little or no attention to the role of lexical items (Moudraia, 2001). This refers back to the era when structural linguistics and audiolingualism were so popular. Advocates of audiolingualism believed that learners' efforts must mainly focus on mastering grammar. In fact, they downgraded lexis as the basis of language, and held that once basic structures of a language had been mastered, new vocabulary could simply be 'slotted in' (Nunan, 2003). In other words, students were supposed to learn a lot of words, usually nouns to name a lot of things, and then use syntax to talk about those things. They were expected to use sentence grammar to do what they had never been prepared for, that is, linguistic novelty and creativity (Lewis, 2000, 2008).

In the twenty-first century, many teachers and educational systems still adhere to these stereotypes and view language as a composite of discrete components to be learned and practiced independently. Further, most students in these contexts come to associate this methodology with language classes despite the fact that their completion of such (structural) exercises generally does not enable them to express themselves creatively in the L2. Recently, Lewis (1993, 2000, 2008) has taken this traditional view as a point of departure for his Lexical Approach and argues that this lexicalized-grammar view (i.e., "fixed" vocabulary and "generative" grammar) is an "invalid over-simplification" (2008: 11). He further contends that emphasis on mere sentence grammar (rather than word or text grammar) only provides the rules to analyze language but not ready-made lexicons as

mental storage to which grammatical knowledge can be applied in novel language use. He then submits that once the learner has stored sufficient fixed and semi-fixed prefabricated chunks or lexis in the mental lexicon, s/he can recall and map them onto grammatical structures for any future linguistic novelty and creativity. Therefore, learners can best learn language when they use such components to communicate meanings. The Lexical Approach thus places communication of meaning at the heart of language and language learning and attaches more importance to the main carrier of meaning, i.e., vocabulary or lexis (Lewis, 2008).

This perspective, as Lewis (2008) notes, is basically inspired by the Natural Approach and subsequently invigorated by emergentist, usage-based and dynamic systems theories (Dörnyei, 2009; Weinert, 2010). These theories hold the basic premise that language development is a self-organizing, complex, and dynamic phenomenon, grounded in lower, emergent processes (Dörnyei, 2009). From an emergentist perspective, although most structural syllabuses have presumed that teaching should be organized, linear and systematic, learning is, in effect, non-linear, holistic, cyclical, and evolves over time. In other words, teachers cannot control what students learn, in what order they learn, or how fast they learn (Willis, 1990). Learning is not simply an additive process, and it involves learners re-organizing their previous interlanguage. This is because new input requires learners constantly to make re-adjustments to what they have internalized. For instance, learners may not get the present perfect before they have understood the simple present and the simple past tenses, and this reflects the interconnections of all verb forms in relation to each other. That is, tenses are interrelated and the learners' understanding of a particular verb form develops as they face different applications of a verb tense and experience its uses in relation to other tenses (Lewis, 2000).

Hopper (2002) defines this cyclical process in which movement towards a complete construction is constant while completion is always deferred as 'emergent grammar'. Emergent grammar is a set of routinized and frequently used constructions, accumulated fragment by fragment as learners become more and more involved in communicative activities (Hopper, 1998). The creative production of these routinized constructions demands prior knowledge of prefabricated chunks, available for use in appropriate contexts. Based on this view, the rules of the system are intrinsically incomplete and evolve over time out of exemplars of simple, local schemas (Hopper, 2002).

This view, as noted earlier, lies at the heart of Lewis's account of grammaticalized lexis which, in turn, has an important implication for English language teaching (ELT). In the Lexical Approach, the central theme is "raising students' awareness of, and developing their ability to 'chunk' language successfully" (Lewis, 1993: vi). The notion of chunking relates to the ways lexical items are naturally stored and retrieved in the memory as wholes (Lewis, 1993). From a psycholinguistic vantage point, the basis of native speaker fluency is control of a vast repertoire of these chunks and formulaic lexical phrases (or formulaicity). Also, research on first language (L1) acquisition (e.g., Tomasello, 2000) has shown that exposure to highly repetitive chunks or lexical frames learned as wholes is an intrinsic part of L1 acquisition, and, insofar as L2 attainment involves similar (linguistic or learning) mechanisms and human learners, certain commonalities in terms of underlying psychological processes are highly likely. For instance, MacWhinney (2004) and Dörnyei (2009) argue that the key learning processes underlying child L1 acquisition (e.g., statistical and frequency-based learning) are observable in SLA. The Lexical Approach thus assumes that

the processes involved in the learning of L1 and L2 can be similar in that the lexical phrases or unanalyzed wholes play a crucial role in both processes (Hunston & Francis, 2000). Recent interest in chunking and formulaicity has even aspired Kweldju (2004) to look for neurolinguistic evidence to support the notion. He argues that the right hemisphere is initially involved in processing and storing formulaic expressions or unanalyzed wholes, with the left hemisphere subsequently coming into play to analyze the language patterns for future creative production. As the pioneer of this notion, Seliger (1982) notes that the data first processed in the right hemisphere can be further processed in the left hemisphere for linguistic creativity. This neurolinguistic account in turn elucidates why drills do not seem to contribute to immediate natural language use. To put it another way, the basic concern to the Lexical Approach is how L2 learners can build mental phrasal lexicons which are similar to those created by native speakers (Lewis, 2000).

Other SLA researchers such as Ellis and Larsen-Freeman (2006) seem to be intrigued by usage-based premises similar to those inspiring a lexis-based view of L2 learning. They use the term "grammaticalization" to refer to the emergence of syntactic constructions from frequent occurrence of linguistic elements for functional language use. In a similar vein, Diessel (2004) argues that complex syntactic constructions may develop out of exemplars of simple ones. In the Lexical Approach, therefore, lexis has gained ground as an important aspect of language teaching and learning in L2 classrooms. In the lexis-based view, according to Lewis (2008), a "good vocabulary" means not only knowledge of enough words but also an adequate phrasal lexicon. In this view, vocabulary no longer takes care of itself, as was held in traditional grammar-based views, but essential lexis should be selected and deliberately included in instructional materials and activities. The classroom schedule, besides ensuring sufficient exposure to lexis in context, should also aim to maximize the likelihood of learners turning lexical input into intake (Lewis, 2008). However, inclusion of an adequate lexical syllabus does not imply a one-brick-at-a-time approach to vocabulary input as the mental lexicon develops not linearly, but holistically. This view, by implication, assigns little control to teachers over what is actually learned because students learn a great deal from indirect (or incidental) exposure to language through reading, listening, or, in general, working with lexis, without the need for the teacher to present a description of what is taught (Willis, 1990).

Inspired by the Lexical Approach, several studies (e.g., Channell, 1994; Gilquin, Granger & Paquot, 2007; Koosha & Jafarpour, 2006; Lee, 2011; Park, 2012; Quinn, 2015; Rahimi & Momeni, 2012; Rahimi, Momeni & Nejati, 2012) have investigated the effects of implementing a lexis-based view using concordancing materials on L2 learning. Their results point to the effectiveness of corpora in improving students' L2 skills. Rahimi *et al.* (2012), for instance, found that concordancing packages had a positive effect on improving students' achievement in vocabulary and reading. Similarly, Quinn (2015) reported that corpora have the potential to support the L2 writing process at the discourse level and learner concordancing can offer students an alternative reference to traditional dictionary searches. Further evidence comes from Huang (2007) and Gardner (2007) suggesting that learners need a great deal of exposure to reading materials emphasizing new lexis in order to better retrieve L2 vocabulary in their productive skills. However, other studies (e.g., McEnery, Wilson & Baker, 1997; Schmidt, 2001) have raised concerns about the presumed success of the Lexical Approach in grammar learning. Schmidt (2001), for example, argues that some type of explicit focus on form is also required for learners to notice and learn L2

grammatical structures. In a similar vein, McEnery *et al.* (1997), using corpora for grammar teaching at the pre-tertiary level in the UK, conclude that although integrating a corpus-based methodology is beneficial to improving language proficiency, it might be insufficient for developing higher levels of linguistic accuracy. Further, Sinclair (1991) suggests that consciousness-raising about the links between form and meaning might minimize the learning load, and that learners can use corpus evidence to develop individual creativity in language classrooms.

In recent years, advances in computer technology have contributed a great deal to vocabulary research and pedagogy (Nunan, 2003). One of these advances is the advent of corpus linguistics which has in turn led to the design of various databases or corpora, on- or offline. This modern linguistic trend is interested in probing language use in real-life situations and encourages inductive generalizations about emergent tendencies, or lexical co-occurrence and recurrence. Word meanings, in this view, are captured through searching for statistical tendencies of phraseology, collocations, colligations, cognates, and lexical bundles as well as their distributions in natural language data. Corpus linguistics has rather diminished the importance of traditional lexicology, or semantics of word meanings in isolation based on language-internal relations (Rajagopalan, 2004). This new development could have a great impact on language teaching, especially from a lexical perspective. According to Lewis (1993), evidence from corpora, computational linguistics, and discourse analysis should now influence syllabus content and sequencing. There are also corpus-oriented instructional materials which emphasize empirical data and present a better quality of learner input and a better understanding of lexical patterning in specific contexts (Campoy-Cubillo, Bellés-Fortuño & Gea-Valor, 2010). Because of the accessibility to natural written and spoken corpora, students now have more opportunities to develop a better understanding of real language use than before (Lewis, 2000).

Three important UK-based corpora include the Collins Birmingham University International Language Database (COBUILD), the Cambridge International Corpus (CIC), and the British National Corpus (BNC) (cf. Richards & Rogers, 2001). The COBUILD Bank of English was the starting-point in this area under the direction of John Sinclair (O'Keeffe, McCarthy & Carter, 2007). The purpose of this project was to provide learners with dictionaries and materials which focused on real language use and meanings which learners were often required to use in real communicative settings. The COBUILD learners' dictionaries, grammars and usage manuals facilitate the incorporation into syllabuses of findings on frequency distribution and collocations through genuine rather than invented or intuitive examples (Römer, 2010). Another corpus resource is the CIC which comprises vast, methodical collections of both spoken and written language. The CIC consists of more than one billion words, which along with COBUILD is constantly being updated to allow the monitoring of language usage (O'Keeffe *et al.*, 2007). The CIC also features learner corpora which include more than 27 million words of learners' writing, 12 million of them error coded. Consequently, this provides information about the common lexical and grammatical errors which are made by learners and allows dictionary and materials writers to highlight common problems. Finally, the BNC is a freely available corpus that notably contains samples of spoken language (ecologically collected from real spontaneous discourse) as well as written language (obtained from a wide range of disciplines, including humanities, arts, social sciences, medicine, and natural sciences), and gives access to lexical patterning as well as other phraseological phenomena (Gilquin *et al.*, 2007).

In retrospect, L2 research has recently witnessed a growing focus on chunks as potentially useful units of analysis or praxis (e.g., Ellis, 2003; Lewis, 1993, 2008; Schmitt, 2004; Taguchi, 2007), on the one hand, and the application of computers to assist language learning and teaching, on the other. Much of the research taking place in both domains, however, has been disjointed and mostly independent from each other. In other words, computer-assisted language learning (CALL) research accumulated over the years has, unfortunately, in certain cases been more of the bandwagon type and, in other cases, not adequately inspired by theoretical and experiential knowledge gained in the fields of applied linguistics or language teaching methodology. There is thus a need for research that systematically probes the interface of insights coming from the theory side (i.e., SLA and applied linguistics) as well as teaching experience and resources offered by the rapidly advancing domain of computer technology. In principle, according to Lewis (1993, 2008), implementing the theoretical and pedagogical framework envisaged by the Lexical Approach suggests a substantial role for the use of corpora, concordance programs, and virtual learning environments. Inspired by a lexis-based view of L2 teaching, this study is, therefore, an attempt to address this lacuna and systematically explore the interface possibility of notions offered by the Lexical Approach and the affordances provided by computers. To this end, an original corpus-based computer platform was designed which enables access to various software and online resources. In addition to authentic language use and (offline) collocational options, the database has other online and software applications such as online concordancing, identifying different word meanings in different contexts of use, test-taking and feedback provision, test designing or editing, and repeated practicing of lexis through various lexical exercises.

3 Method

3.1 Participants

A cohort of 50 Iranian students at grade three of junior high school participated in the main instructional phase of the current quasi-experimental (control-group, pretest/posttest) study. They were all female students within the age range of fifteen to sixteen, and their L1 was Persian. In Iran's religious educational systems, boys and girls go to separate schools from primary school to their final year in senior high school when they graduate with their diplomas. In university, however, students of both genders can attend the same classes. Gender is similarly an important issue for teachers; therefore, both classes were taught by one of the researchers who was a female MA student of TEFL (Teaching English as a Foreign Language) and also an English teacher formally hired by the Iranian Education Ministry. The students attended two EFL classes in a junior high school in a southwestern city in Iran. There were 25 students in the experimental group and 25 others in the control group. They attended their EFL classes two days a week, receiving four hours of instruction each week. An online Cambridge Preliminary English Test (2014) was initially administered to both groups to ensure homogeneity of the groups in terms of language proficiency. Both groups were classified as elementary learners of English. None of them had been to an English-speaking country or attended any English language institute.

3.2 Materials and Instruments

After homogeneity of the groups' general proficiency was tested, a vocabulary pretest was developed and used to measure students' prior lexical knowledge. The target vocabulary items were from amongst those supposed to be covered later in both "lexis-based" and "grammar-based" instruction. In terms of format, the test items were similar to lexical exercises suggested or used by Lewis (1993, 2008), for instance fill-in-the-blanks or completion, matching, short-answer, sentence recognition, and sentence-writing questions incorporating the target words. The possible maximum score on the test was 20, and the tests were checked and marked by the teacher-researcher (see Appendix). Two standardization meetings were held to agree on the range of acceptable responses in order to ensure consistent scoring outcomes. Specifically, two experts (researchers) judged and set the responses. The test was then examined for reliability and validity. The validity of the test was ensured basically through content validity. To this end, a detailed (achievement) test specification was first designed based on the content of the syllabus. Then, 65 items were constructed also benefiting from two experts' judgments. The test was first piloted with 30 female Iranian EFL students at the same level but in a different high school. Based on the results obtained from the item analysis stage, the items with acceptable item difficulty and item discriminability were retained in the test. The intra-rater reliability of the test was estimated to be 0.92, having the rater re-examine the pretest papers after a week. The construct reliability of the pretest estimated by Cronbach's alpha was also found to be 0.82.

To implement the Lexical Approach in the experimental classroom, the multi-purpose LexisBOARD computer platform was designed which provided students with concordances of authentic (spoken and written) language as well as other software and online affordances. The aim was to design an appropriate resource which was easy to use and localized, based on learners' needs and interests. In Iranian high schools much emphasis is put on development of students' EFL reading skills (Mirzaei, Rahimi & Heidari, 2014). Further, as noted above, learning, practicing, and testing words in the form of Present-Practice-Produce are common activities in Iranian EFL classrooms, of course, besides grammar-based exercises. Therefore, LexisBOARD offered different software accessories and database resources whereby students could engage with L2 lexical items (needed for their educational level) within multi-word chunks in the form of an "Observe-Hypothesize-Experiment cycle" (Lewis, 1993: vii). Moreover, to cater for different tastes, a varied set of practice, test, quiz, and feedback affordances were available for individual experimentation with L2 lexis. Meanwhile, although a corpus does not directly tell users the meanings of lexical items or phrases, LexisBOARD was a combination of a dictionary and a corpus which provided students with different meanings of the target vocabulary based on the context of use they chose or concordance lines of words and chunks. Different word meanings and the authentic language use were extracted from the Collins COBUILD Dictionary (2006), and examples of concordance lines were taken from the BNC (2007). LexisBOARD also provided this possibility for users to be linked to the original database from which the concordance lines were taken and conduct further explorations. The rationale for designing a local lexis package was that corpus tools come in so many shapes, not all of which are necessarily compatible and useful to all groups of teachers, learners, or material designers. Thus, it was considered worthwhile creating corpus-based activities which take into account all the important variables such as age, gender, type of school, level
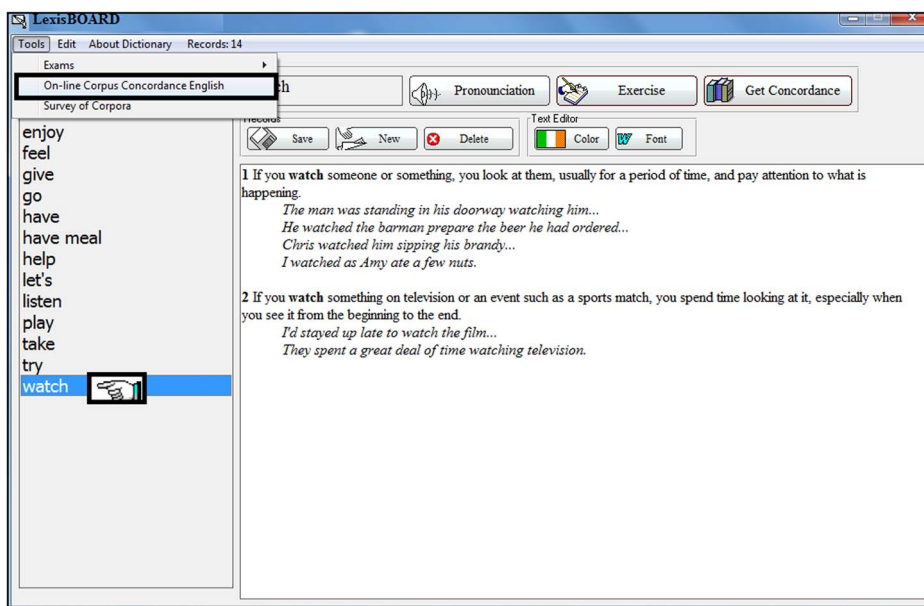
Fig. 1. The LexisBOARD display of lexical patterning for *watch*.

of study, teacher's qualifications, class size, location, nationalities, and students' difficulties (O'Keeffe *et al.*, 2007). The figures below show different uses of LexisBOARD by these Iranian junior-high-school students; an access link to the demo version of LexisBOARD is available upon request.

In addition to different lexical meanings (see Figure 1), students also have access to different images for various co-occurrences of lexical phrases (Figure 2). Lewis (2000, 2008) encourages the use of visual presentations such as picture or image as useful techniques in teaching vocabulary.

As displayed in Figure 3, LexisBOARD provides students with examples of concordance lines for the target vocabulary. Additionally, students are given a text in which the target lexical phrases, word combinations, collocations, prepositional usage, and style are used authentically, information that is missing in Iranian EFL textbooks.

LexisBOARD also provides students with tests or quizzes for self-assessment. The software then checks students' performance and provides them with appropriate feedback along with their test scores when they click on the "correct" button. Finally, LexisBOARD's test affordance provides the test taker with the correct responses when they fail to benefit from the feedback and simply click on the "answer" button. The software also has the option to export a sample test to a word document. Figure 4 shows typical questions on different lexical phrases which co-occur with *take*.

For listening, which is one of the main techniques of the Lexical Approach, LexisBOARD plays sentences and students are asked to discriminate chunks while listening (see Figure 5). Other questions examine collocational and communicative uses of language. In these questions, students are initially assessed on the authentic use of lexical phrases, and are then asked to create a dialogue with the target phrases to notice lexical patterns and make their own generalizations about the L2 lexis.

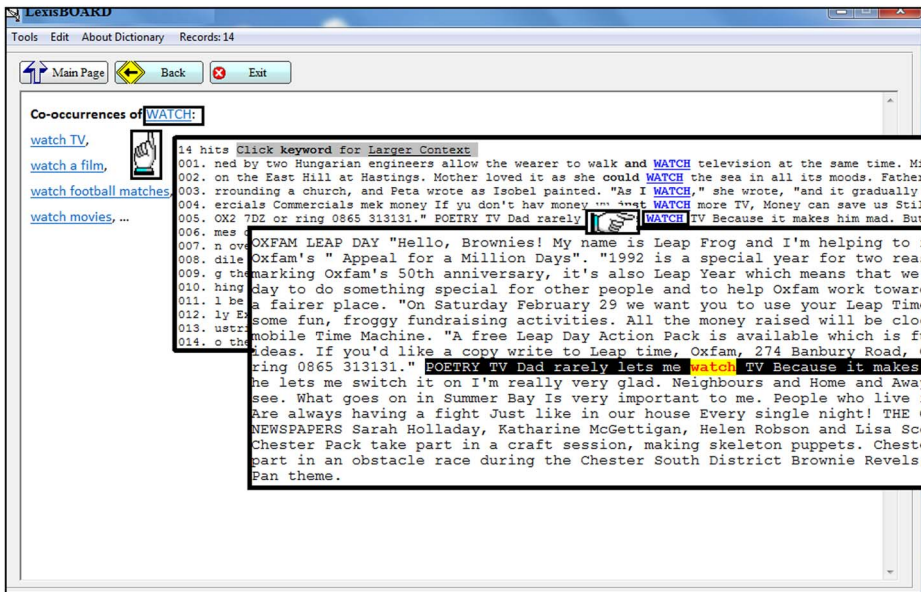Fig. 2. Various images for co-occurrences of *let's*.

Fig. 3. Concordance lines of *watch*.

As noted earlier, within the Lexical Approach, greater emphasis is put on introducing and practicing lexis, which means directing and helping students collocate words and grammaticalize from lexis (Lewis, 1993). In other words, teachers can exploit lexical exercises as a means for further focus on lexical phrases which determine grammar and carry more

Fig. 4. Sample test items on the use of co-occurrences of *take*.

Fig. 5. Sample listening items on discriminating chunks, and conversation-making.

meaning than syntactical structures. LexisBOARD provides exercises for each lexical phrase, with an emphasis on language chunking and learning of formulaic expressions, and working out meanings through the context of words and collocations. LexisBOARD provides exercises to further practice the use of lexical phrases and collocations (Figure 6).
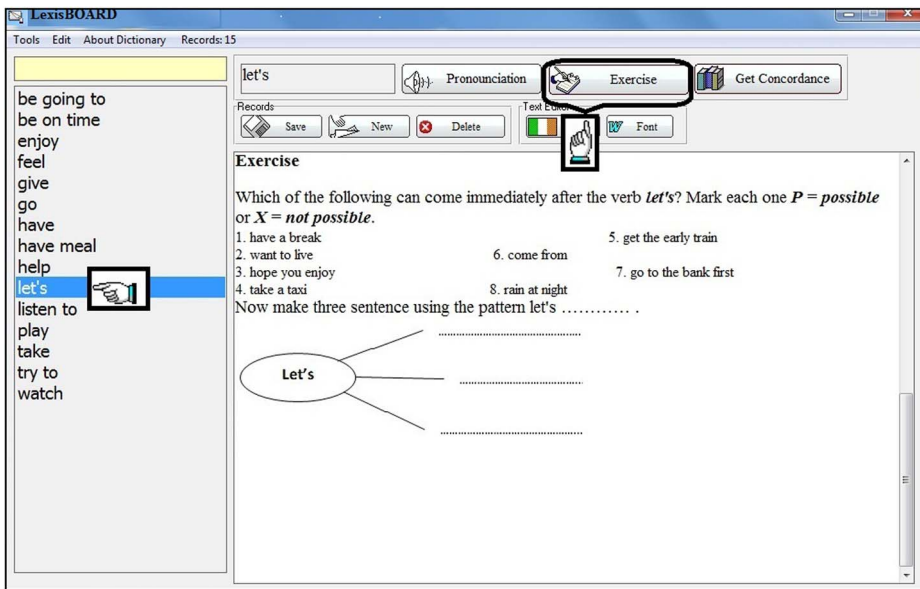
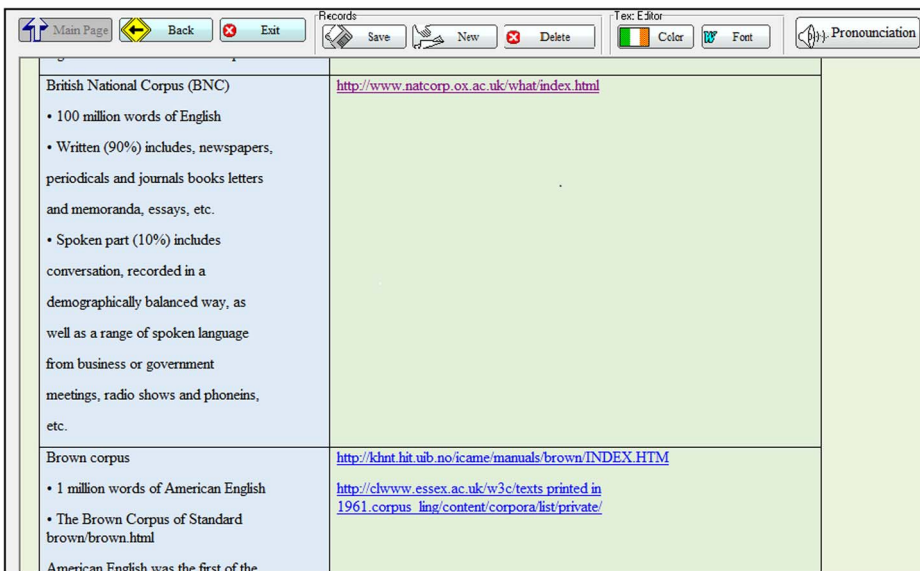Fig. 6. A sample exercise for the practice of co-occurrences of *let's*.

Fig. 7. LexisBOARD software tools.

As displayed in Figure 7, the LexisBOARD database contains other software tools such as a survey of corpora (O'Keeffe *et al.*, 2007) which helps students access the corpus resources available electronically, options for changing visual effects such as font and color, a phonetic presentation program to improve pronunciation, and word document tools such as "save", "delete", and "new".

3.3 Procedure

In the second session of the course, pretests were administered to the groups, and one-way ANOVA results were obtained showing no significant differences between the groups in terms of prior L2 vocabulary knowledge. Not being aware of the experimental group condition, the control group was then instructed through traditional Iranian EFL textbooks. Each Iranian EFL textbook lesson contained a main dialogue (one—two minutes in length, ranging from five to eleven turns), followed by sentence patterns and grammar exercises which occupied most parts of each lesson. Afterwards, a reading passage mainly focused on the structural rules of each lesson in context and elicited the target patterns through the reading comprehension questions following it. A list of single words was provided at the end of each lesson which students were supposed to use according to their knowledge of grammar. The control group was thus instructed through traditional techniques of vocabulary teaching (such as word lists, translation, memorization, written and oral drills, flash cards, and definitions), besides the routine techniques of grammar teaching. As to word meanings, decontextualized explanations were usually given without collocational uses of language, concordances, or corpus-based activities. Further, discrete-point test items were occasionally used to assess the students' progress with the content. With the experimental group, although the LexisBOARD software was designed so that it would be easy to use, the teacher trained the students for two sessions and constantly provided know-how updates for new features of the computer platform. Care and patience were exercised to ensure all learners could use the software applications autonomously and experiment with different functions according to their interests. Each week, about fifteen minutes was set aside for the students to share their feedback from working with the software program, and necessary updates were given. In general, no specific technical or procedural problems disrupted the course, and the experimental students' end-of-the-course attitudes towards their experience with LexisBOARD were very positive. It is worth noting that students' general perceptions were elicited orally in class every other week and at the end of the course. In brief, the following Lexical Approach techniques suggested by Lewis (1993) were implemented to increase students' knowledge of lexical units:

- intensive listening and reading in the target language;
- L1 and L2 comparisons and translations carried out chunk by chunk rather than word for word;
- repetition and recycling of activities;
- guessing the meanings of new vocabulary items from context;
- noticing lexical patterns and collocations;
- working with corpus-based dictionaries and other reference tools.

Instruction for both groups lasted for fifteen weeks, two days a week and about two hours a day. After the instruction, posttests were given to students in both groups.

4 Results

Descriptive statistics and appropriate statistical analyses were conducted to address the research question and examine whether there was any significant difference between the

Table 1 *Descriptive statistics for pre- and posttests*

Group	Test	N	Min	Max	Mean	SD	Skewness	Kurtosis
Lexis-based	Pretest	25	8	17	12	2.37	.44	−.62
	Posttest	25	10	19	15.76	2.50	−.38	−.83
Grammar-based	Pretest	25	6.5	15	11.80	2.43	−.44	−.62
	Posttest	25	10	15.5	12.16	1.23	−.38	−.83

effects of the computerized lexis-based instruction and the traditional grammar-based instruction on the L2 vocabulary achievement of these junior-high-school students. Descriptive statistics of the groups' performances were first computed to ensure normality of distributions on the pretest and posttest scores and also to obtain general estimates of the groups' vocabulary achievements.

As displayed in Table 1, Kurtosis and Skewness values of the students' scores on both pretests and posttests were well within the range of ±1.5 and indicate acceptable normality distributions. Regarding the participants' vocabulary pretest scores, the mean scores were roughly the same, i.e., 11.8 and 12.0 for the grammar and lexis groups, respectively. This initial similarity was reassuring in the sense that the groups were homogeneous in terms of prior L2 vocabulary knowledge and belonged to the same learner population. However, regarding the groups' posttest scores, the difference between their mean scores looked rather large (12.16 for the grammar group and 15.76 for the lexis group), which was submitted to further statistical analysis.

Subsequently, a one-way analysis of covariance (ANCOVA) was conducted to compare the longitudinal effects of both instruction types on students' vocabulary posttest performances (i.e., as the dependent variable in the ANCOVA), while simultaneously controlling for pretest differences as the covariate in the analysis. The grouping or independent variable in the analysis was type of instruction (i.e., lexis-based vs. grammar-based). Specifically, the ANCOVA examined whether the difference between posttest mean scores of the groups was statistically significant or not. The ANCOVA test was preferred for this situation since it analyzes group-mean differences on the posttests while simultaneously controlling for the pre-existing differences between the groups as measures by the pretests. Furthermore, according to Pallant (2010), ANCOVA is very useful in situations where there are rather small sample sizes and it is not possible to randomly assign participants to the different groups. Initially, preliminary analyses were calculated to ensure no violation of the assumptions of normality, linearity, and homogeneity of variances.

The ANCOVA results in Table 2 demonstrate that the difference between the groups' post-instruction vocabulary test scores was statistically significant, $F (1, 47) = 55.17$, $p < 0.0005$. Further, the obtained partial eta squared result (0.54) was sufficiently high, indicating that the variance in the dependent variable (posttests) is explainable by the type of instruction employed for the groups. In simpler terms, the lexis-based instruction, emphasizing lexical patterning of multi-word lexical expressions through the use of LexisBOARD, significantly improved these Iranian junior-high-school students' L2 vocabulary achievement.

Table 2 *ANCOVA results for vocabulary tests*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	219.02	2	109.51	39.32	.000	.62
Intercept	138.34	1	138.34	49.67	.000	.51
Pretest	57.02	1	57.02	20.47	.000	.30
Group	153.66	1	153.66	55.17	.000	.54
Error	130.89	47	2.78			
Total	10094.00	50				
Corrected Total	349.92	49				

5 Discussion

This study set out to implement the Lexical Approach through a multi-purpose computer-ized lexis-based software program called LexisBOARD in an EFL classroom to compare its effect on L2 vocabulary achievement with that of the mainstream non-computerized grammar-based teaching methodology. To recap, the multi-purpose LexisBOARD software was designed as a computer-mediated platform to put the theoretical premises of Lewis's Lexical Approach into practice and test them through both static (e.g., exams) and dynamic (i.e., connected to online corpora) affordances. The results demonstrate that the computer-ized lexis-based instruction, drawing upon unanalyzed chunks and other conventionalized multi-word lexical phrases as its basic units of analysis, led to considerable vocabulary improvement over a semester-long course. This is an important finding as it can have different theoretical and pedagogical implications for the ever-growing body of lexis-based research. On a macro psycholinguistic level, this noticeable increase in a group of learners' lexical ability (practicing L2 lexis through a computer platform) further supports emer-gentist usage-based theories (inspiring the Lexical Approach) in that language competence is not so much dependent on a "core grammar" as on a structured inventory of recurrent linguistic constructions (Dörnyei, 2009). The end result of this usage-based process would be further lexical automatization and, in turn, turning discursive but recurrent sequences of linguistic elements into "grammaticized linguistic constructions" (Tomasello, 2000: 162). It is important to note that this study only focused on the contribution of lexis to L2 vocabulary achievement and further experimentation is needed to explore the notion of lexico-grammar (DeCarrico & Larsen-Freeman, 2002; Schmitt, Dörnyei, Adolphs & Durow, 2004), or whether lexis-based language teaching practically results in any "grammaticalization," as is assumed by the lexis-based view.

On a pedagogical level, the post-intervention improvement witnessed in the experimental group's vocabulary knowledge can be taken as evidence to further support, firstly, the use of the lexis-based approach as the main methodological framework and, secondly, the inter-face of lexis and corpus-based technology. As Nattinger and DeCarrico (1992) and Lewis (1993) note, both research and experience have shown that all learners initially use a large number of unanalyzed chunks in certain predictable social contexts. Research now suggests that use and subsequent noticing of lexical properties are basic to language acquisition (Lewis, 1993). It is surmised that the mind stores useful lexical clusters or multi-word expressions as holistic units which are later more easily retrieved and processed than the

same word sequences generated through slotting vocabulary into syntactic patterns (Schmitt, Grandage & Adolphs, 2004). This ease of access to formulaic sequences pre-packaged in memory in turn allows for more fluency and subtle cognitive processing of language patterning. Boers, Eyckmans, Kappel, Stengers, and Demecheeler's (2006) findings add support to this notion, demonstrating that students' noticing and subsequent use or intake of formulaic sequences (a process they call "phrase-noticing" or 'chunk-noticing') significantly contributed to their perceived oral proficiency. Similarly, Taguchi (2007) found that chunk learning (or memorizing) increased sensitivity to discourse features and, over time, served as a basis for creative discourse construction.

Furthermore, the instructional as well as self-reflexive affordances that the computer-aided LexisBOARD offered to learners in the current study helped them and the teacher overcome the menacing chaos initially conveyed by an intention to work with "boundless lexis" as the basis of instruction. First, LexisBOARD enabled the teacher to keep track of the vocabulary reservoir needed for that very educational level of interest. Second, the software simultaneously made it easy to ensure students would notice the concurrence and recurrence of lexical items in different polyword, collocational, colligational, and formulaic patterns. More importantly, offline dictionary as well as online corpora functions were available for further learner exploration or self-regulation. In this way, learning tends to become more individualized, aligning instructional affordances with the individual's real needs. Students, in turn, become researchers whose learning is driven by access to genuine linguistic data and, in the long run, feel more responsible for their own learning. In this study, for instance, students used LexisBOARD to verify their intuitions about the use of lexical items in real-life examples without completely resorting to dictionaries for general-purpose meanings.

The findings concur with other research attempts which have sought to make a case for the lexis-computer interface (e.g., Chen & Baker, 2010; Cobb, 2007; Curado Fuentes, 2001). For instance, Cobb (2007) found that students' working with VocabProfile, which links words and texts to dictionary, lexis, and concordances, can multiply learning opportunities. In addition, working-to-learn experience with technology fosters learner autonomy for life-long L2 learning (Hafner & Miller, 2011; Kim, 2014). It seems clear that technology can give unprecedented access to self-study, self-assessment, and feedback resources for language learning both inside and outside the classroom. The findings, by implication, can be taken as evidence that interlinking lexis with technology within L2 classrooms will be productive and thus a necessity in today's technology-driven world. In this regard, Lewis (1993) and O'Keeffe *et al.* (2007) submit that computational linguistics or corpus technology should influence syllabus content and sequencing as technology use can make L2 learning more effective by providing students with authentic language gathered in an electronic format (McEnery & Wilson, 1996). A word of caution, however, is in order. The main challenges for designing software lie in the development of theoretical rationales for selecting and sequencing resources and providing smooth, principled access to them (Cobb, 2007). In brief, the corpus- or lexis-based approach can provide the theoretical framework to bridge this gap.

6 Conclusion

The findings of the current study show that adoption of a lexis-based view to teaching language skills, especially vocabulary, can be advantageous, raising learners' awareness of

the concurrence and recurrence of lexical items in real language use. The design and use of the LexisBOARD software also indicates that computerized platforms and corpora offer practical, down-to-earth choices and affordances to put a lexis-oriented view into practice in L2 classrooms. However, this research focused on the use of L2 vocabulary in recognition and production tasks in a paper-and-pencil test, and more research is thus necessary to examine the effects of similar instructional materials and techniques on learners' speaking ability. Furthermore, the software applications covered only 20 new lexical items during the instructional period. However, the lexis-based framework, in principle, transcends word limitations by creating an expanding web of related lexical chunks and constructions through the learner's ongoing experience of language use. To conclude, it should be noted that, despite its utility and practicality, the Lexical Approach still has not found its way into EFL contexts in Iranian high schools as it may seem to challenge the mainstream grammar-based view (Lewis, 1993). According to Lewis (2008), it is hard to implement this methodology without having a clear view about the role of lexis. This consequently requires teacher education programs to further emphasize the importance of lexis-based instruction in L2 teaching. In summary, as Wray (2002) and Schmitt *et al.* (2004) claim, research into the role of formulaic sequences in L2 acquisition is still rather limited. Therefore, now that emergent item-based views have gained much ground in SLA, it seems to be an opportune time to devote further attention to this area.

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Appendix

Lexis Pretest-Posttest

Name: ……...   Grade: ……...   Class: ……...

1	Which nouns often go with which verbs? Complete the chart. Use each word only once. One word is extra.	**points** 2.25

the piano, the picture, the trumpet, a film, Jazz, the piano, the radio, movies, the music, a football match

Play	Watch	Listen to

	Now write a sentence with each lexical expression. 1. ……………………………………………………………………… . 2. ……………………………………………………………………… . 3. …………………………………………………………..…... .	1.5
	Your teacher will read the following sentences. Write the numbers of the ones you hear.	1.25

2		

Sentences	The number you hear
a. Sorry, I cannot	……...
b. Is this better?	……...
c. She is sitting there.	……...
d. I have no idea.	……...
e. Yes, I have.	……...

	From the above list, choose the best answer for each of the following: 1. Where is your mother sitting? …………….………… . 2. Have you finished your homework? …………….………… . 3. Can you help me with physics? …………….…………. . 4. Can you turn down the TV a little more? …………….………… . 5. What's your opinion about Jack's family? …………….………… .	2.5
	Now, make two-line dialogues, using as second lines the sentences you haven't already used.	2

3	How many lexical expressions can you make which use:	2

a. part of the verb *have* with:
b. part of the verb *give* with:

1. a party	2. your tickets ready
3. me a call	4. a very difficult life
5. a cup of tea	6. time to ….
7. a cold	8. me your cold

4	Which of the following can come immediately after the verb *let's*? Mark each one P = possible or X = not possible.	2

1. have a break	2. want to live
3. rain at night	4. take a taxi
5. get the early train	6. come from
7. go to the bank first	8. watch a film

Now make three sentences using the pattern '*let's* ….………'.   *(1.5)*

Let's
....
....
....

5	Fill in missing parts in dialogue with appropriate words.	1.25

A student talks to his teacher before class.

S: Excuse me, Mr. Johnson?
T: Yes. What can I do for you?
S: Sorry, may I be excused from class this afternoon? I'm not …………. very well.
T: What's wrong?
S: I think I've got a cold. I ……..….. a terrible headache.
T: Oh, you ….……… sore eyes, too. You can ……..….. home and rest. I hope you ….…..…… better afterwards.
S: Thanks for your help.

6	Look at the statements. Which statements *say hello*? Which ones *say goodbye*?	1.5

Hello!   GOODBYE

Statements	Saying hello	Saying goodbye
1. How are you?	……..	……..
2. See you later.	……..	……..
3. Take care of yourself.	……..	……..
4. How's everything?	……..	……..
5. Good evening!	……..	……..
6. Goodnight!	……..	……..

7	What does Bill do every day? Fill in the blanks with appropriate lexical phrases. Use chunks from the list. One chunk is extra.	2.25

wake up, have dinner, have coffee, get up, go swimming, go to bed, watch television, go to work, use a computer, go home

On weekdays (from Monday to Friday), Bill …………….. early at half past six, but he ……...….…… at seven o'clock. Then, he usually …………..…… and toast for his breakfast.

After breakfast, he gets dressed and ……...….…… at twenty past seven in his car. It takes more than one hour to reach his office. He is usually at work around eight thirty. He works in a library. He …………......…… to do his work. After work, he……...……… and rests.

At night, he cooks food and ……...…..… at eight P.M. He usually cooks spaghetti for his dinner. After dinner, he ……………... for about 1 hour. Then, he ………..….…… and sleeps. He never goes to bed late.

Total	
20	