

Interactive Puzzles in Vocabulary Instruction: Teachers and Learners as Designers ^(*)

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Abstract: Crosswords and other word puzzles are commonly enjoyed by a great majority of people in our daily lives, and they are also used in books and other instructional materials. In language teaching and learning, paper-based and interactive puzzles have been used to add flavour to vocabulary acquisition processes in terms of teaching spelling rules, internalising lexical meaning, recognising synonyms and word collocations and so on. The introduction of Web 2.0 technologies has added further dimensions to their preparation and use, such as user-friendliness, flexibility and ability to share, making them easier to access for both instructors and teachers. However, some foreign language teachers may not be familiar with how to prepare interactive puzzles and how to utilize puzzles that are produced using Web 2.0 tools in vocabulary instruction. Therefore, this study aims to give an overview of interactive puzzles generated using Web 2.0 tools and other software and how to utilize them in vocabulary acquisition. To this end, this paper elaborates on the use of puzzles in vocabulary acquisition within the framework of emerging Web 2.0 technologies. The researchers describe simple design procedures involving Web 2.0 tools and other educational software to do away with the misconception that it is the job of an expert to build up interactive puzzles. Moreover, they also make some practical recommendations to materials designers, teachers and learners to help them harness the power of puzzles in vocabulary instruction.

Keywords: Interactive puzzles, Web 2.0 tools, vocabulary instruction, learners and teachers as designers

Kelime Öğretiminde Etkileşimli Bulmacalar: Tasarımcı Olarak Öğretmen ve Öğrenciler

Özet: Günlük yaşamımızda birçok kimse kare bulmacalar ve diğer kelime bulmacalarından hoşlanmaktadır ve bu bulmacalar kitaplarda ve çeşitli eğitim materyallerinde kullanılmaktadır. Dil öğretiminde ve öğrenmede, kağıt-kalem bulmacaları ve etkileşimli bulmacalar yazım kurallarını öğrenme, kelime anlamını içselleştirme, eş anlamlı kelimeleri farketme ve kelime eşdizimliliğini öğretme vb. konularda kelime öğretimine renk katmak için kullanılmaktadır. Web 2.0 teknolojilerinin ortaya çıkması; bulmacaların ha-

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zırılanması ve kullanımında, kullanıcı dostluğu, esneklik ve paylaşma imkanı gibi yeni boyutlar kazandırmış ve hem öğretmenlerin hem de öğrencilerin bu bulmacalara kolay erişimini sağlamıştır. Ancak bazı yabancı dil öğretmenleri etkileşimli bulmacaları hazırlamaya ve Web 2.0 araçları ile hazırlanan bu bulmacaların kelime öğretiminde kullanımına aşina değildirler. Bu nedenle bu çalışma Web 2.0 araçları ve diğer yazılımlar ile oluşturulan etkileşimli bulmacaları ve bu bulmacaların kelime öğretiminde nasıl kullanılacağı üzerinde durmaktadır. Bu amaçla bu çalışma kelime öğretiminde bulmaca kullanımını Web 2.0 çerçevesinde ayrıntılı olarak ele almaktadır. Araştırmacılar etkileşimli bulmacaları hazırlamanın bir uzmanlık işi olduğuna dair yanlış kanıyı ortadan kaldırmak için Web 2.0 araçlarını ve diğer eğitimsel yazılımları içeren basit tasarım işlemlerini betimlemektedirler. Ayrıca materyal tasarımcılarının, öğretmenlerin ve öğrencilerin kelime öğretiminde bulmacaların gücünden faydalanabilmeleri için bazı pratik önerilerde bulunmaktadır.

Anahtar Kelimeler: Etkileşimli bulmacalar, Web 2.0 araçları, kelime öğretimi, tasarımcı olarak öğrenci ve öğretmenler

Introduction

Word puzzles can be used to introduce the element of fun into the lesson, and they can activate students in a lesson, and they can be used for revision and consolidation (Serna and Azor, 2011). The use of puzzles, especially crosswords, might help motivate students and provide a non-threatening environment for learning (Burston, 2005; Keshta and Al-Faleet, 2013; Febtrina, Suparman and Supriyadi, 2014). Moreover, they help learners get involved in active learning (McKeachie, 2002; Weisskirch, 2006; Raines, 2007; Serna and Azor, 2011; Jaramillo et al., 2012; Keshta and Al-Faleet, 2013).

Different forms of puzzles have always existed since ancient times. Earlier puzzles were mostly of logical and mathematical type, but some other forms are not as old as these. For example, the crossword puzzle was invented in 1913 and the Rubik's Cube in 1975. After the introduction of the former, there was massive interest in puzzles in the early 20th century. As people learned about various puzzles, they organized leagues, tournaments and published specialized magazines (Danesi, 2002). Therefore, puzzles gradually became a part of daily life. Once people were familiar with various word puzzles, some researchers took interest in puzzles to use them in practical ways. However, previous work has been limited to paper-and-pencil puzzles prepared by the expert and published in books (e.g. Latorre and Baeza, 1975; McElroy and Samaniego, 1981; Wharton, 1995). Burston (2005) attributes this to the time and effort essential to produce crosswords manually. Due to this relative challenge, puzzles such as crosswords "have at most only been used episodically in the foreign language curriculum." (Burston, 2005, p. 5). However, today there are user-friendly ways to build vocabulary puzzles on the computer or Internet. Creating web-based puzzles using offline and online software is increasingly getting

easier, and since the dawn of Web 2.0 tools, there has been a rise in the use of web-based puzzles by technology enthusiasts. Therefore, this paper gives an overview of puzzles that can be used in teaching and learning vocabulary and outlines the user-friendly ways of building different types of puzzles to broaden current knowledge of building web-based puzzles. It is divided into five sections. The first section gives background information on the functions of puzzles in foreign language instruction and how web-based puzzles differ from their traditional versions. The next section looks at various puzzle types and how they can be built using computer software and Web 2.0 tools. Some conclusions are drawn and some recommendations are made in the final section.

1. Background to the Study

McElroy and Samaniego (1981) point out that traditional puzzles and crosswords can be constructed to help learners in the learning of various language skills, grammar, vocabulary and culture. Crosswords, for example, can be used for other purposes in a language class than just providing entertainment. One such method, illustrated by Wharton (1995) is to use crossword puzzle with only half of the solutions to promote communication between two learners, thereby contributing to the development of communication strategies. Without looking at the partner's puzzle, the student asks questions about the incomplete words in his/her puzzle, the other student does the same. In this way, they use a lot of communication strategies. Games and puzzles relieve the tension which is caused by high level of attention paid by learners to follow the lesson. In addition to functioning as an outlet for the accumulated energy, games help the teacher to add variety to the lesson and to break the routine (Latorre and Baeza, 1975; Burston, 2005). Puzzles can fulfil a number of other functions. They are used to:

- encourage creativity.
- teach simple fixed expressions, idioms and phrasal verbs.
- use words in a context.
- learn new words and revise previously learned ones.
- encourage some dictionary work.
- practise word building skills.
- practice English spelling.
- develop editing skills by helping check spelling (he slipped the coffee. –sipped).
- help learners study independently.

Teachers have been able to create puzzles for nearly two decades now. There are quite a few reasons why web-based puzzles are superior to traditional puzzles. For one thing, the former is interactive in nature, while the latter is solely based on what learner already knows, so they may sometimes be boring if the level of the puzzle is not suitable for the

learner. In web-based puzzles, learners can get some hints. For example, a letter of the word may be revealed or a related picture can be shown when the learner feels stifled or helpless. The availability of hints promotes autonomy because learners know that they can get help to complete the puzzle. It is the teacher who decides whether a puzzle should have hint buttons or it is up to him/her to decide whether there should be a time limit. The availability of these options provides the teacher with the opportunity to decide on the level of the crossword. Moreover, web-based puzzles are more colourful than their traditional equivalents and they are easy to produce since there is enough user-friendly software that might help build different types of puzzles, discussed in the next section.

Some researchers, in various fields of study worked on puzzles. Serna and Azor (2011) administered a survey to 84 students to investigate learner perceptions of the use of learner-generated crosswords puzzles in a virtual learning environment. The responses of 84 students revealed that learners found the crosswords puzzles enjoyable and useful. In a similar study, teacher-generated crossword puzzles were found useful by the participants (Weisskirch, 2006). Davis, Shepherd and Zwiefelhofer (2009) used interactive puzzles to test if such puzzles used to review key terms affect the participants' exam scores. In this quasi-experimental study, the researchers gave two classes four tests. Before each test, one group received interactive puzzles with a set of keywords and the other group only the list of the terms tested in the puzzles. That is, each group revised key terms by using puzzles before two exams and worked on a list of the terms for two others. They found that crossword puzzles helped the learners in one of the groups boost their scores in one of the exams, while the second group was not able to boost its scores in neither of the exams for which they revised the terms using puzzles. Jaramillo, Losada and Fekula (2012) asked undergraduate students to create and solve crosswords puzzles, and they found that this activity was innovative, different and fun learning aid. Similarly, in a study on EFL vocabulary acquisition, Keshta and Al-Faleet (2013) found that the learners in the experimental group that studied vocabulary using various puzzles, including crosswords, anagrams, picture puzzles and so forth, outperformed the control group that was instructed traditionally in the post test and the retention test. These studies mostly report positive attitudes towards the use of puzzles in learning, and in some of the studies puzzles helped the participants learn better.

As seen above there are very few studies on the use of puzzles in teaching vocabulary. This lack of interest in the use of puzzles in vocabulary instruction might be attributed to lack of technical knowledge about computers and instructional software. For example, EFL teachers or ELT students in Turkey mostly develop a positive attitude towards computer use (Kulekçi, 2009; Hismanoğlu, 2010; Yüksel and Kavanoz, 2011; Aydın, 2013; Sariçoban, 2013), but they do not have enough knowledge about the use of educational software and have no instructional support, or they do not see computers as instructional tool (Aydın, 2013; Sariçoban, 2013). This might imply that they need guidance on how to use computers for instructional purposes. Therefore, offering teachers with multiple

opportunities to experiment with user-friendly software might encourage them to take action to develop instructional materials to teach vocabulary. In this respect, puzzle creation tools might help teachers and students get acquainted with educational software, this might help open new doors in EFL instruction. Before instructional software to make puzzles are examined, various puzzles that can be creatively produced are covered in the next section.

2. Types of Web-based Puzzles

It is up to the creativity of the designer to vary the types of crosswords, but some useful insight into possible types can provide some guidance when constructing web-based puzzles. Therefore, the following sections mostly introduce the puzzles that are easy to build.

2.1. Crosswords

Many types of crosswords to practice some vocabulary items can be created. The most frequently used one is synonym or definition crosswords. Crosswords can also be about semantically related words such as sports equipment, family members, travel, school, fields of study, etc. The level of the crosswords can be lowered by adding pictures, limiting the target words, giving hints, using a particular topical category or a part of speech and so on. At other times, teachers may add some fun to the crossword by creating a crossword from a number of words having the same ending. For example, words ending in {-ing} (**bring, sing, king, ring, spring, sting, string, swing, thing, wing...**).

Crosswords may help learners either to learn new words or to revise the previously learned ones. They may be more interesting for learners if a keyword option added; that is, a keyword hidden in the puzzle is revealed when the puzzle is completed. Moreover, some crosswords, for example, a crossword about words created from people's names like teddy bear, Levis, sandwich, etc. may facilitate research. In such puzzles learners are directed to do some research if they have little or no information about some of the words tested in the puzzle. There may be a lot of crosswords, some of which are listed below.

- Crosswords with various clues (synonyms, antonyms, definitions, incomplete sentences or a combination of these)
- Unscrambling letters to make words about a group of semantically related words (e.g. words about our body)
- Anagram crosswords (e.g. The first word is "bread"; the definition of the new word is "hair growing on the lower part of a man's chin")
- Crosswords about homophones, collocations, compound words, similes, idioms, proverbs, UK vs. US English, singular vs. plural nouns, etc.
- Context-bound crosswords (e.g. A crossword for a group of words that appear in a text)

There has been a surge of software programs used to produce crosswords with a few mouse clicks. Most of such software programs have been designed to help those teachers who have no HTML knowledge to produce their work and to publish it by embedding it on a certain web page. A user-friendly program is *Crossword Forge* (Sol Robots, n.d.), which enables teachers make crosswords by just writing the clues and the answers in the right places. The next step is to create the puzzle and save it. Both crosswords and word searches can be generated by this program. It is simple and time-saving. However, the type of exercises that can be generated is limited to these two types of puzzles mentioned above. Therefore, besides this program, it may be better to use some other software like Hot Potatoes to vary the exercises.

Another widely used software is Hot Potatoes (Half-baked Software, n.d.), which is used to form online quizzes, exercises and puzzles (See Figure 1 for the interface of the program.). Teachers can prepare different types of exercises with this software: cloze tests, matching exercises, crossword puzzles, multiple choice quizzes, etc. with the help of the five basic components of Hot Potatoes.

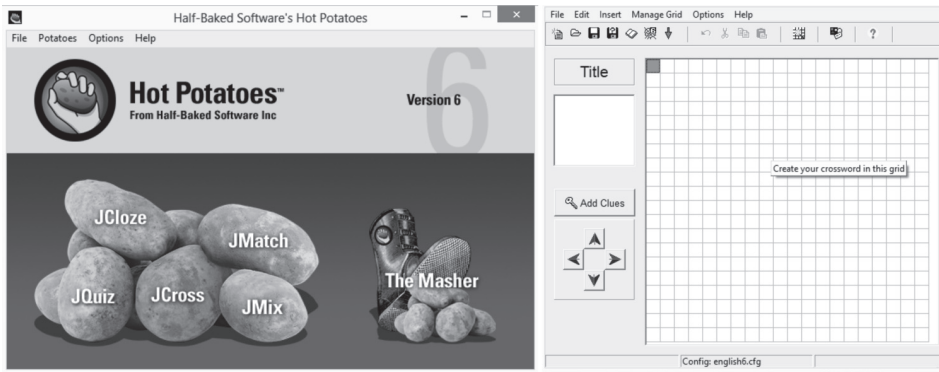


Figure 1. The Main screen and JCross Screen of Hot Potatoes v6 (Half-baked Software, n.d.)

Another way to create web-based puzzles is to use free online tools. Such tools enable teachers and learners to create puzzles (mostly crosswords and word search) and publish them by copying and pasting the source code of the puzzle to a web page or a blog. One such example is Study Stack, which is a flash card site with a profile page for its users. Study Stack allows its users to create a number of activities with a single click. Pasting a list of words and their definitions or synonyms into the activity creation page is enough to prepare more than ten activities some of which are puzzles (See Figure 2).

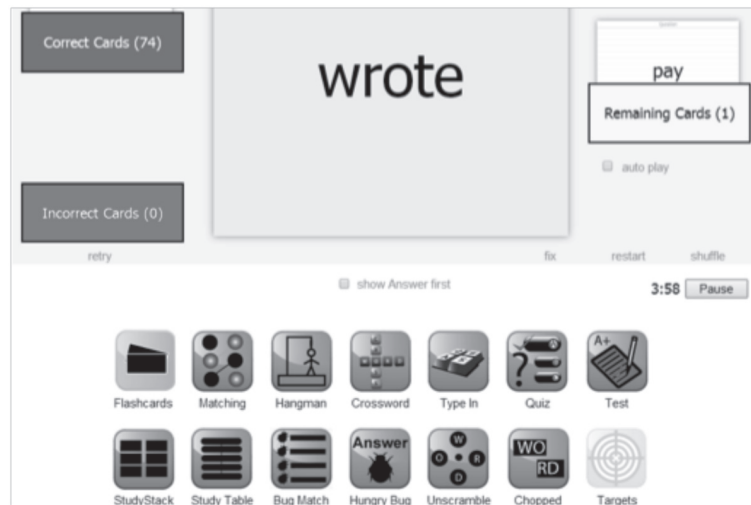


Figure 2. A Web 2.0 tool used to create flashcards, hangman games, crosswords, etc.
(Study Stack LLC, 2014)

2.2. Word Search Puzzles

Word search puzzles teach learners spelling without loading them with tedious, old-fashioned techniques like writing words several times. They also provide learners with visual recognition opportunities. Unlike their older counterparts, these puzzles do not risk wrongly codifying the word in learner's mind. The most important contribution of these puzzles is that they help learners to practice spelling. Word search (or word hunt) puzzles are mostly used as warm-up or revision activities. Classical word hunt puzzles and word snakes can be viewed as types of these puzzles. A modern and easy-to-use example is Photo Soup (Yahoo Games, 2008), a recent version of such puzzles which is produced with a few mouse clicks. Photo Soup makes use of Flickr, a photo view and share site for multiple users. Other online word search puzzle creators can also be used to make online word search puzzles (See Appendix for sample word search puzzle creators.) It is usually enough to write the target words in the space provided and make some preferences (See Figure 3).



Figure 3. A Screen Capture of Photo Soup Beta (Yahoo Games, 2008, Online)

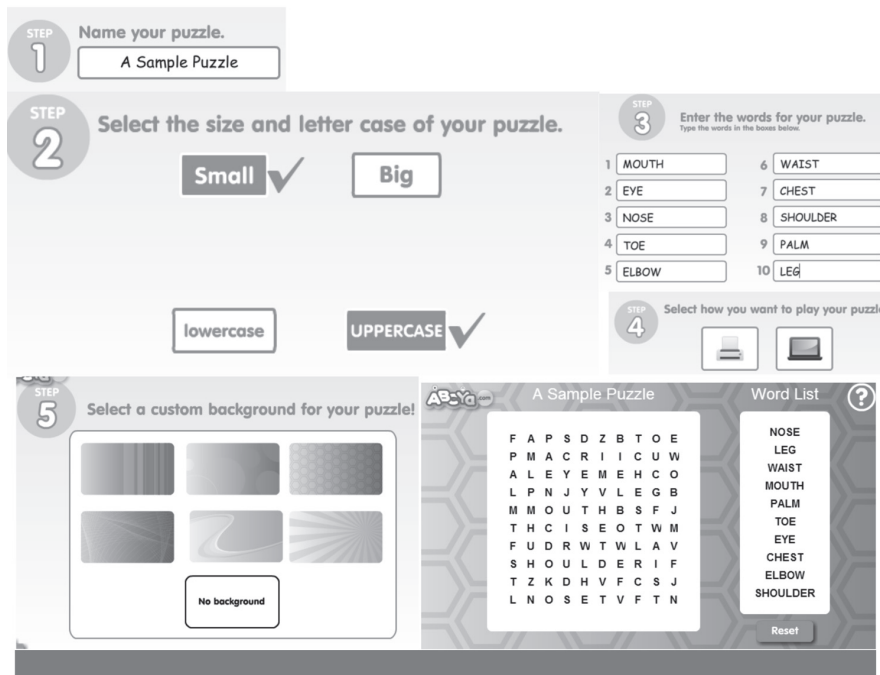


Figure 4. A word search puzzle creator for lower proficiency levels (ABCya.com, L.L.C., 2012)

2.3. Anagram Puzzles

Anagram is a word or phrase spelled by rearranging the letters of another word or phrase. Robinson (1992) defines it as, “a word or phrase formed from the broken-up letters of another word or phrase” (p. 15). A teacher preparing anagram puzzles can come up with really funny end products. Anagrams can also be seen in the form of a crossword. To provide more entertainment, proper names can be used to make anagrams. For example, it is highly notable that the name of the famous scientist Albert Einstein amounts to “Ten elite brains”(Genius 2000 Software, 2009). Anagrams can be used to fill in the blanks in a sentence. Teachers can create anagrams of target words by using related software and use these anagrams in a gap-fill activity prepared using Hot Potatoes or similar software. Unscrambling words can be created with such software as well.

2.4. Puzzles Based on Word Families or Categories

Such puzzles might help learners remember words better because words are easily stored and remembered in word maps. A word map can be formulated as a number of related words coming together to form a cluster. Since related words are learned with ease, dealing with them in a puzzle might help learners to put these words into their long-term memories.

- Grouping the words into categories (Give a list of words and ask the learners to group them according to groups like headwear, footwear, etc.)
- Choosing a group of semantically related words among a number of others (e.g. words about air travel)
- Finding the general word for a group of words (e.g. cat, dog, mouse = animals)
- Odd-one-out

2.5. Puzzles Based on Common Letters, Prefixes, Suffixes and Compound Words

These puzzles help learners recognize the common properties of a group of words. In this way, they not only focus on spelling but also practise related meanings. Consider the words in Figure 2. The meanings of words compounding with “out” are somehow semantically and structurally related. Related words are stored together in the mind. Furthermore, when the puzzle is presented in a lively and colourful medium, it is more likely that learners will remember the words far better.

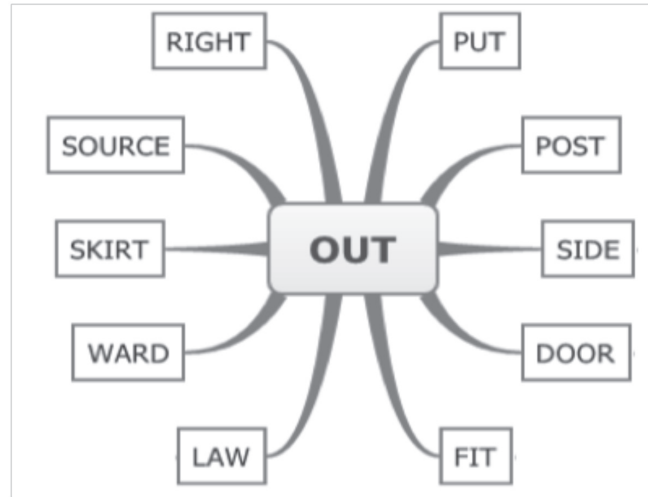


Figure 5. Forming compound words

- Finding the common initial word for compound words (See the figure above.)
- Finding the common final word for compound words (e.g. stomach/tooth/ headache)
- Jumbled compounds (e.g. fly/earth/butter/arm/quake/chair, etc.)
- Two compound words sharing a common element (e.g. bath**room**/**room**mate)
- Finding the common initial letter or prefix (e.g. **un**clear, **un**tidy, **un**lawful, **un**comfortable, etc.)
- Adding prefixes to words (e.g. Add negation prefixes to the following words. __ logical, __mortal, __responsible, etc.)
- Finding the common suffix (e.g. help**ful**, mourn**ful**, colour**ful**, law**ful**, etc.)
- Finding the common syllable or cluster that goes with the end of the first word and the beginning of the second word) (e.g. shake/**keen**, female/**leak**, tear/**arson**, etc.)

2.6. Puzzles Based on Additions and Omissions

These puzzles promote more creativity than others since learners produce new words. Some dictionary work may be necessary to solve such puzzles. Some of these puzzles, for example, puzzle (b) below may develop proofreading skills because the learner considers whether each word is used correctly and appropriately.

- Deleting a letter of a word or adding a letter in a sentence to change the meaning (e.g. He ordered a cup of coffee and slipped it.)
- Finding the missing letter in a word in a sentence (He sipped on ice and fell down. Here the right word is “slipped”).

- Omitting two/three/four letters in a sequence of letters to form a meaningful sentence (e.g. Hewpenthxeroday. (He went there today.)
- Adding the given letter to the word to form another one (Aygün, *et al.*, 2005, p. 32) [e.g. tear +g _____ great _____ (wonderful)]. The same can be made by creating new words from given words by using pictorial clues (e.g. You give the picture of a “tail”, and give some instructions like “-T, +R” to get the word “Rail”)
- Following a sequence of instructions to form new words (e.g. Add a letter–change two letters–delete two letters–add two letters–change one letter = tea–heat–weak–we–week–weep, etc.)
- Creating a new word changing one letter each time (e.g. bed, bad, bid, bit, etc. You form a chain or ladder of words.)

2.7. Puzzles of Unscrambling and Ordering

In unscrambling puzzles part of speech gains importance due to the fact that it is the part of speech of a word that determines where it should be in a sentence. Therefore, learners get acquainted with parts of speech and their function in sentence. These puzzles give learners the chance to see the word in a small-scale context. Alternatively, this puzzle can be more challenging if individual words are also broken apart. In such a puzzle learners are given a beginning syllable or a cluster and they are asked to form meaningful sentences by unscrambling. Apart from jumbled sentences, learners may be given jumbled compounds (hand/book, house/hold, hand/made, etc.) and be asked to form compound words from the list given, or they may be asked to order adjectives on a scale. Ordering exercises can be very creative. For instance, learners are given a group of words of body parts and they are instructed to order words from head to toe (spatial ordering).

- Jumbled compounds (e.g. hair/work/goal/fire/keeper/pin, etc.)
- Ordering words (e.g. adjectives on a scale like cold, warm, hot, etc. and frequency adverbs and so forth)

Though these puzzles may not be constructed by everyone, there are lots of puzzles that can be generated with the help of the software introduced below.

Recommendations on Using Web-based Puzzles

Teachers can consider the following recommendations if they want to create and use puzzles effectively.

- It is possible to publish puzzles in certain web pages or in the form of SCORM packages which are embeddable learning objects commonly used in learning management systems such as Moodle, Blackboard or WebCT. A major advantage of such packages is that it is possible to track learner answers to the items in the

puzzles. Moreover, such learning objects are customizable and reusable. In addition, embed codes provided by some online tools can be used to insert puzzles in web pages, blogs and other online environments. Some online puzzle creation tools also make it possible to store the puzzles in the user's account (e.g., Study Stack LLC, 2014).

- Creativity can be improved if both teachers and learners collaboratively create content by using some user-friendly software. If learners get the right guidance from their teachers, they can also create unique puzzles. Creating content for a puzzle site seems to be one step further than just solving puzzles on the Internet. Therefore, learners will be more adept users of a set of words which they struggle to learn if learners are involved in such puzzle creation.
- If a teacher wants use learner-generated puzzles, a good strategy might be to provide learners with screencasts demonstrating how to use a particular puzzle or exercise creation tool. In this way, learners might be more productive.
- It is recommended that teachers who want to design authentic puzzles look for unique programs that can offer them the type of the puzzle they desire.

Conclusion

Sample web-based puzzle creation tools presented above are by no means comprehensive because more interesting and unique puzzles can be created if creative minds are at work. Similarly, the software tools to produce these puzzles are just a few examples; a thorough research may reveal some more online or offline web-based puzzle makers. There is almost no limit to the types of puzzles to generate by using various downloadable and executable programs that generate puzzles with the input provided. However, most programs on the market including the most expensive ones do not give the opportunity to vary your puzzles. It is up to the imagination of the teacher to produce unique puzzles that help learners to practice vocabulary. In most cases, puzzles produced with flash and java technologies are more difficult to produce since they entail certain programming skills unless teacher-friendly technologies are used. In spite of all these limitations, current PC programs and web tools offer a lot of opportunities for teachers. The Internet is full of programs that are waiting to be discovered to help teachers to produce online content.

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Appendix

A List of Sample Web-based Puzzle Creation Tools

Sample Crossword Generators

- Crossword Puzzle Games: <http://www.crosswordpuzzlegames.com/create.html>
- Eclipse Crossword: <http://www.eclipsecrossword.com/>
- Puzzle Fast Instant Puzzle Maker: <http://www.puzzlefast.com/>
- Instant Online Crossword Puzzle Maker: <http://www.puzzle-maker.com/CW/>
- The Read Write Think Crossword Puzzle Tool: <http://www.readwritethink.org/files/resources/interactives/crossword/>
- Discovery Education's Puzzle Maker: http://puzzlemaker.discoveryeducation.com/CrissCrossSetupForm.asp?campaign=flyout_teachers_puzzle_crisscross
- Crossword Puzzle Maker: <http://www.armoredpenguin.com/crossword/>

Crossword Puzzle Maker: <http://worksheets.theteacherscorner.net/make-your-own/crossword/>

(e.g., Crossword Compiler, Crossword Weaver, Cross Works, etc.)

Sample Word Search Generators

Word Search Fun: <http://www.wordsearchfun.com/>

Word Search Maker: <http://www.wordsearchmaker.net/>

Detective Word Search: <http://www.funbrain.com/detect/>

Word Search Maker: <http://tools.atozteacherstuff.com/word-search-maker/wordsearch.php>

SuperKids Word Search Puzzle Creator: <http://www.superkids.com/aweb/tools/words/search/>

Discovery Education's Puzzlemaker:

<http://puzzlemaker.discoveryeducation.com/WordSearchSetupForm.asp>

Word Search: <http://www.armoredpenguin.com/wordsearch/>

Instant Online Word Search Maker: <http://www.puzzle-maker.com/WS/index.htm>

Just Word Search: <http://justwordsearch.com/>

