Crossword Puzzles as a Tool to Enhance Athletic Training Student Learning: Part I

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ATHLETIC TRAINING STUDENTS typically expect instructors to assign textbook readings and use classroom lectures to disseminate information. They also expect instructors to assess knowledge using traditional testing methods, such as written and/or oral-practical examinations, research papers, lab assignments, etc. Nontraditional teaching techniques, such as games, puzzles, and computer-based learning activities, appear to be a viable option to promote student interest in reading and learning.[1-5] The purpose of this report is to assist instructors in the design and utilization of crossword puzzles as a learning and assessment tool in the athletic training education classroom.

Research

Individual students demonstrate specific patterns of behavior in terms of the manner in which information is processed, retained, and utilized. There does not appear to be one dominant style of learning among athletic training students.[6-9] Therefore, instructors should make an effort to incorporate teaching strategies that accommodate different learning styles. Crossword puzzles[10-11] and computer-based learning activities, such as Jeopardy® and Who Wants to Be A Millionaire,[5] have been shown to motivate student learning[12-13] to increase students' confidence in learning abilities[10] and to promote growth in cognitive knowledge.[5,13-15] Research has documented that students believe games and crossword puzzles help them to improve recall of terms and definitions and assist them in learning course content.[2,12,15]

Procedures and Techniques for Designing Crossword Puzzles

Designing a crossword puzzle is a relatively simple process. Depending on the complexity of the puzzle and the instructor's familiarity with the necessary software, the total time required to construct each crossword puzzle is between 45 and 60 minutes. The instructor begins by selecting a software program designed to create crossword puzzles. Retail software usually offers users advanced features (e.g., Crossword Construction Kit©, http://www.crosswordkit.com/), but an Internet search will yield a wide number of free, user-friendly programs. Green Eclipse.com© offers Microsoft® users a free copy of software entitled Eclipse Crossword (http://www.greeneclipsesoftware.com/eclipsecrossword/). This program is very user-friendly and offers a variety of features, including manipulation of the puzzle shape, size and

Key Points

▶ Crossword puzzles can help motivate students to comprehend course materials compared to traditional learning methods.

▶ Crossword puzzles are easily generated, often using free computer software programs found on the Web.

▶ Instructors generate associated clues and word lists for students to solve, based upon course materials.

▶ Multiple designs, complexity, and readability of crossword puzzles can be manipulated by the instructor.

intersection of clue words, publication to the Web using interactive JavaScript, and the ability to print answer keys and puzzles with answer clues.

To create a crossword puzzle, the instructor generates a word list and associated clues (Figure 1).[16] The word list may be generated from materials associated with class lectures, assigned book chapters, or supplemental reading assignments. Clues associated with the selected words may be definitions, cognitive prompts, or short statements (Figure 1). For example, an instructor may create a crossword puzzle on the topic of stretching or flexibility, with the term "static" on the word list. The associated clue for the word "static" may be written as "one of three types of stretching techniques held for a finite period of time."

Figure 1   Instructor generated word list with associated clues.

The word list does not need to be confined to single-word answers. For example, an instructor may choose to use "slow reversal hold" as an answer. The associated clue for this complex term may be written as "A PNF stretch using reciprocal inhibition (Hint: 3 words)." We recommend that the word list and associated clues are limited to 15-25 items, which does not impose an unreasonable time burden for completion of the puzzle by students.

After the word and clue lists are developed, the instructor is prompted to identify a primary word around which the crossword puzzle will be constructed and to determine the size of the puzzle (Figure 2).[16] After entry of this information, the software generates the crossword puzzle grid using the word list and placing the associated clues in the appropriate "across" or "down" columns (Figure 3).[16] Instructors also have the ability to select the font size and shape of the crossword puzzle. Puzzles can be printed with or without

an answer key or clues and can be saved as an HTML file or a rich text file (RTF), a Windows metafile (WMF), or a PostScript file (EPS).

Insights and Suggestions

If using information from a textbook, avoid selection of terms from the beginning of a section to ensure that the students read the entire text or chapter. Be sure to avoid misspelling and lack of agreement between singular and plural word forms (i.e., a singular form for a correct response paired with a plural form associated with the clue, or vice-versa). When using multiple-word terms (e.g., "static stretching" or "proprioceptive neuromuscular facilitation"), avoid use of spaces between the words when inputting them to the crossword puzzle creator program. Input them as "staticstretching" or "proprioceptiveneuromuscularfacilitation." Finally, avoid the use of numerical symbols, and include an instruction to the students that numbers must be entered as words (e.g., two).
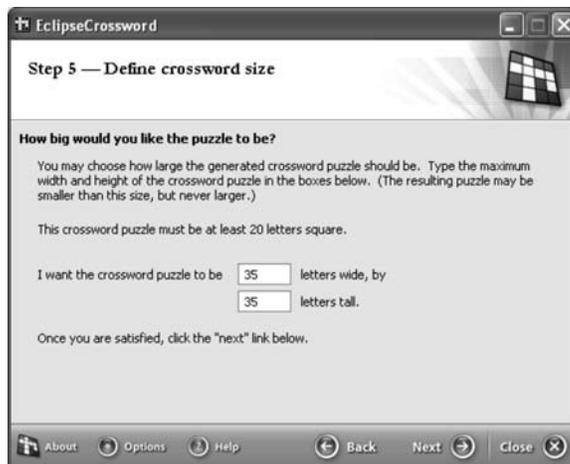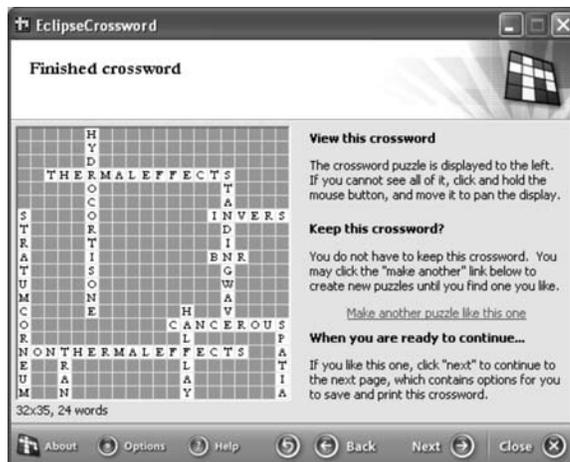

Figure 2   Determining the size of the puzzle.

Figure 3   Example of a completed puzzle.

Crossword Puzzles as Assessment and Reinforcement Tools

Completion of a crossword puzzle can require students to use resource materials to locate answers. When used as a course assignment, the instructor may choose to assign point values to each correct response or for completion of the entire crossword puzzle. If used as an assessment tool, instructors may create small puzzles as examination components. Instructors may also assign groups of students to the task of creating puzzles and grade them on the basis of creativity. Crossword puzzles can also be used as a learning reinforcement tool or interactive game before administration of a conventional examination.

Conclusion

Crossword puzzles can be utilized as a nontraditional teaching method. They can be used in any course to provide a fun and interactive method for reinforcement of cognitive information presented in lectures, introduction of new concepts, or assessment of student learning. Crossword puzzles provide an instructor with a mechanism to supplement course materials, to address different learning styles, to promote student motivation, and to engage students in the learning process. Part 2 of this report will examine the effectiveness of crossword puzzles for development and retention of students' knowledge related to therapeutic modalities and students' learning preferences for the content. ▌

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