

Crossword Puzzle: An Innovative Assessment Tool to Improve Learning of Students in Forensic Medicine

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Abstract

Background: As per Medical Council of India (MCI) for setting teaching learning standards according to need of society, now has focus shift from traditional teaching methods to adopting teaching learning method that is been termed as competency-based learning. Faculty training programme by MCI are also providing the right platform for learning the new methodology in medical education.

Objectives: To prepare an interesting and effective tool in assessing the knowledge of Forensic medicine among the medical undergraduate students to produce competent and confident Indian Medical Undergraduates.

Methodology: Crossword puzzle exercise was given to 2nd year students, who were in 5th semester. 38 students participated in this study. A questionnaire was given to the participants to evaluate the response consisting of 15 questions; responses were obtained on Likert scale 5 to 0.

Results: Out of 38 students 92% of students found the puzzle interesting. 76.4% students found this puzzle as a useful tool to learn forensic medicine. 73% students agreed it to be a useful tool for the assessment of their knowledge. 81% students were in favour to use such puzzle in competitive exams. In terms of retaining the knowledge of topics, 84 % students found this puzzle useful.

Conclusion: Crossword puzzle improves memory power, performance and critical thinking of students with fun. This can be tried as a question in periodic internal examination for internal assessment as well as well as for the purpose of structured viva examination in university examination.

Key words: MCI, traditional teaching, medical undergraduate, cross word, assessment

Introduction

Teaching and learning are mutual procedures that influence each other, and assessment determines both students and teacher's effort¹. The purpose of assessment is to impart quality education to students, to give feedback to the educational managers about the curriculum, and to categories the students according to their talent and to monitor their own learning. Assessment also provides

a high degree of fairness and objectivity in testing and produces data to enable continuous quality improvement². The welfare and indeed the future health of people depend on the quality of medical graduates which in turn depends on quality of medical education. Educationists believe that simply by changing the assessment style for the learners can affect the way students engage with the subject contents³. Assessment drives learning and learning drives practices. By changing the format of assessment or examination, can lead the students to engage their study more thoughtfully; their focus can be shifted to clinical rather than theoretical issues⁴.

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The crossword puzzle is a century old game and was first used in ancient Egypt. In 1913, Kathryne

created a modern crossword puzzle⁵. In recent years, it has become an interesting game and we come across it in many newspapers, magazines, books, and journals. Some magazines even offer prizes for solving it as an incentive for the participants. Recently educationists have started using these puzzles as an educational tool especially in medical education and nursing courses.⁶⁻¹² Crossword puzzle can also be used as an innovative tool for assessment of undergraduate medical students.

This exercise helps them to remember the forensic medicine terms easily, understand the concept and helps the teachers to evaluate the students' knowledge and understanding. It can detect the misconceptions and help to clarify the concepts of the medical student.^{13,14} The benefits of such active learning are that it promotes the communication ability, memory, cooperation among learners and their critical thinking power.¹⁵

Such games are important in acquiring skill and psychomotor knowledge, brain functions like understanding, thinking, remembering and analyzing the facts.^{16,17} The crossword puzzles are in various forms including cryptic form, symmetrical form.

Since medical education has changed dramatically in last few decades, the assessment of knowledge of medical students also needs to be changed and it needs to be effective as well as interesting. Crossword puzzle will prove as an effective tool for assessment in terms of recall and analysis of knowledge. Forensic medicine is a very important subject for the medical student for their career, and for the medico-legal system to have more experts. The crossword short answer question (SAQ) stimulates the cognitive function. Due to previous experience in crossword puzzles¹¹, the author got an idea to use his puzzle in the examination as short question answer.

The literature search did not show any crossword puzzle tool in form of short question-answer assessing the knowledge of the forensic medicine in medical students. This is an innovative tool for the above purpose and hence this study was planned. We tried to evaluate the crossword puzzle tool for assessment of their knowledge and also analyzed their feedback for the crossword exercise given to them.

Materials & Method

The present study was a prospective cross-sectional analysis of feedback questionnaire. This study was

carried out in the Department of Forensic Medicine, MAMC Agroha after approval from institutional ethics committee. The crossword puzzle exercise was formulated with the terms and words from taught syllabus of Forensic Medicine was formed. This puzzle had varying degrees of difficulty which were evenly distributed; key related to each question was prepared, including facts, hints or statement related to the question. This puzzle was distributed to faculty of forensic medicine for validation. Suitable changes after validation were incorporated. A feedback questionnaire was prepared by the authors consisting of 15 questions evaluating student's perception on the given crossword puzzle, its impact on retaining and recalling the knowledge and further utilization of such puzzle in different disciplines of Under graduate curriculum. The questionnaire was also given to senior faculty of the various streams of medical undergraduate subjects for validation. The validated feedback questionnaire was used for responses. All the feedback responses were graded on Likert scale from 5 to 0 in which grade 5 was awarded to those who strongly agreed, 4 to those who agreed, 3 to those who moderately agreed, 2 to those who least agreed, 1 to those who strongly disagreed and those who did not respond were given grade 0. A total of 38 students of 5th semester participated voluntarily after briefing them about the method and purpose of this crossword puzzle and feedback questionnaire. Each question was awarded score 1 (for correct) or 0 (for incorrect), with no negative marking. All the participants were given a crossword puzzle sheet, a paper for keys, and a questionnaire. Participants were instructed not to use internet, mobile or any books. They were allotted 45 minutes to solve the puzzle. The puzzle had 9 horizontal and 8 vertical words to fill with the help of 17 key statements (Figure 1 and Figure 2). After completion of 45 minutes, a questionnaire for feedback was given to the participants and 15 minutes to read the questions carefully and to answer. The crossword entries were checked and each participant was marked out of 17. Marks scored by students and response to feedback were analyzed with suitable analytic tests.

Results

Out of total 38 students; 11 students secured 16-17 marks, 17 students obtained marks between 13-15 and 5 students obtained 10-13 marks. Of the total, 47.23% did not agree that it was a wastage of time. 81.6% students felt this method less time consuming as compare to traditional examination methods. 65.8% students also

agreed to take part in preparing cross word puzzles by their own. Other responses of the feedback are depicted in figures 1 to 3.

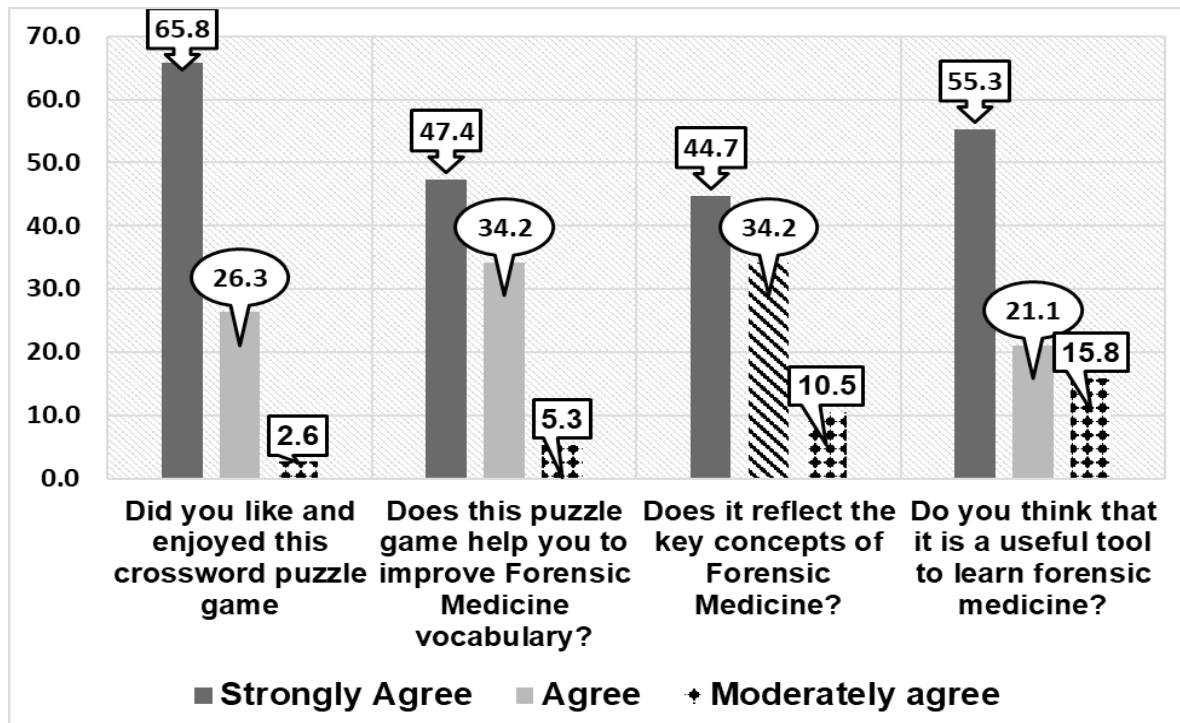


Figure 1: Students perception on cross word puzzle in Forensic Medicine

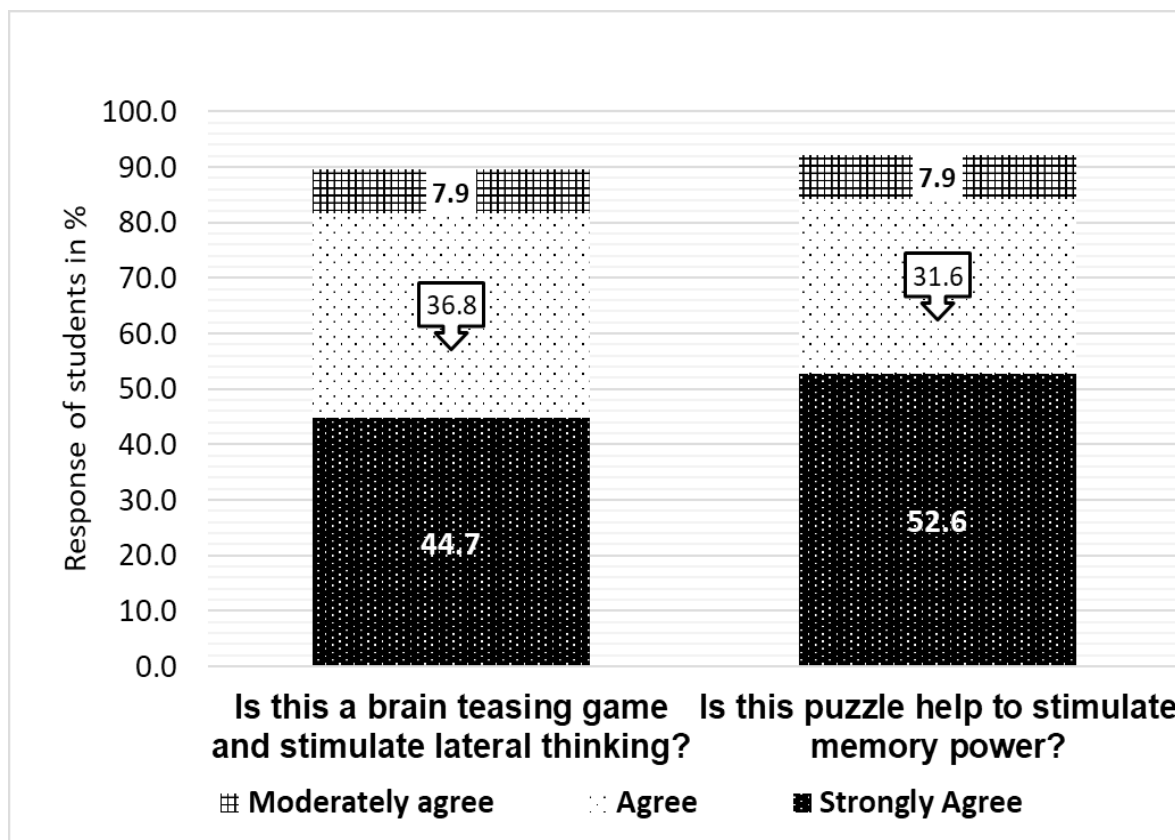


Figure 2: Students' perception on recalling the information by cross word puzzle

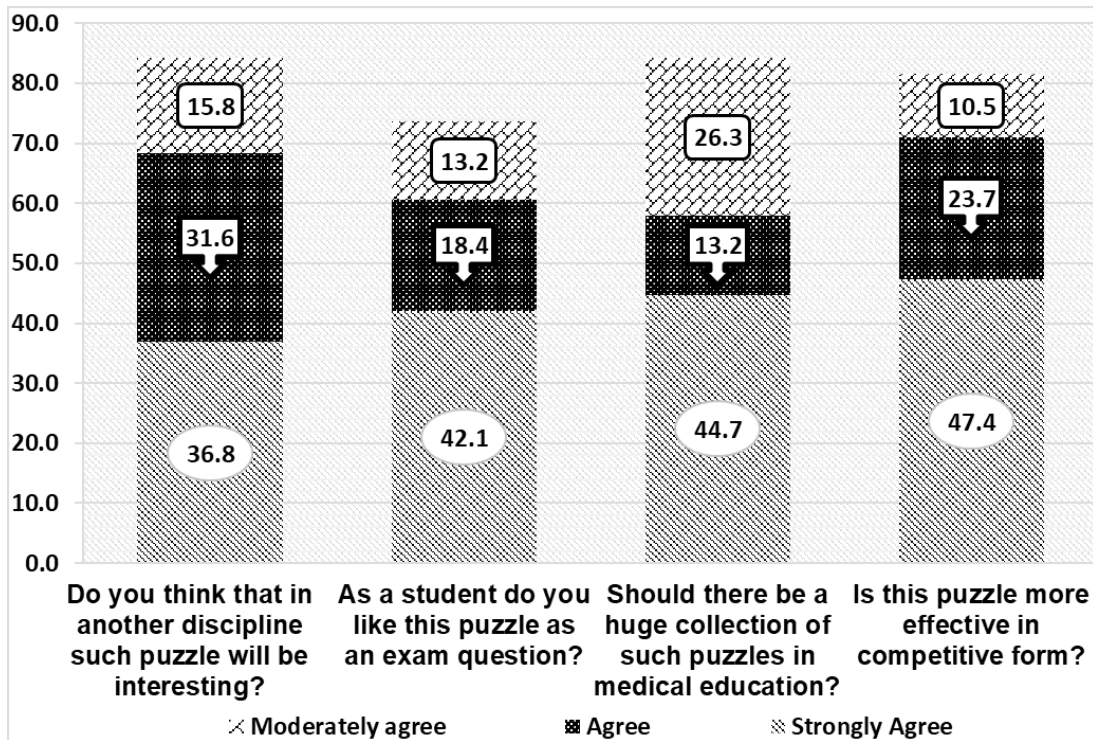


Figure 3: Students’ feedback on implementing such crossword puzzle in other disciplines

Discussion

The crossword puzzle is a very interesting word game and many people enjoy this game. Crossword puzzle as a teaching tool is very beneficial in remembering the words and terms with the help of keys. The key consists of facts, hints or statements in the form of a word, facts, terms or incidences and when a student reads the key, he recalls the answers easily. As we know that memorizing any fact needs its correlation and memorization of other related facts¹². Once he remembers the related words, he has to fit the answer in the crossword by counting the number of alphabets mentioned in the key. This is how it stimulates thinking and improves the memory. This same mechanism of recalling is useful in an examination which will automatically improve the performance in an examination too¹³.

We did this survey to study the individual performance of an undergraduate medical student without any help or without the cooperation of groups. So, it becomes easy to know the performance of a single student, because in a group usually, one or two students are active, and others are passive and so the assessment is not for all¹³.

Bailey et al used four types of games like crossword puzzles, words scramble, word search and hidden

message puzzles, in gastrointestinal physiology teaching. According to them, in the crossword puzzle, inability to identify the word indicates the weakness and that can be corrected by proper teaching.¹⁰

Htwe et al did the study on crossword as a teaching tool on the group of students and revealed that is an excellent tool for teaching pathology with fun.¹¹ Saxena et al. also did the same study on groups of students and they concluded that students liked the crossword puzzle as a teaching tool.¹²

We believe that for teaching and learning purpose this survey can be used on a group of students, but for the assessment of the students, the student must solve the crossword puzzle individually. In our study, the main aim was to study the crossword puzzle as a tool to assess the students in an examination, so we did not make the groups of students. Playing with such puzzles, psychomotor skill and knowledge both are increased.¹² We did this study for the subject of forensic medicine which is a brain teasing discipline where the student must churn the thought process for the complicated case scenario with various medico-legal aspects, like a detective. Nowadays many of the medical schools and colleges emphasize on student oriented medical education where the active involvement and participation of every

student is necessary, especially in small group teaching, for better and detailed understanding of concepts in medical science. The students are encouraged to solve the problems by themselves.^{18,19}

Crossword puzzle improves cognitive function as per clinical trial done by Wolinsky et al.²⁰ They used computerized crossword puzzle in a clinical trial on middle aged and old people to study the cognitive processing speed and concluded that crossword puzzle delays the decline in the cognitive process and improves the speed of the cognition.

Conclusions

Majority of participants liked the crossword puzzle as an examination question. It improves memory power, performance and critical thinking of students with fun. This can be tried as an examination question in periodic internal examination for internal assessment and can be used for the purpose of structured viva examination in university examination in other disciplines of medical undergraduate curriculum paving the way for creating more competent medical graduates, the need of the society at present time.

Ethical Clearance: Taken by Institutional ethical committee

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Conflict of Interest: Nil

References:

1. Kellough RD and Kellough NG. Secondary School Teaching: A Guide to Methods and Resources; Planning for Competence. 1999. Prentice Hill, Upper Saddle River, New Jersey.
2. Amin Z. Purposeful assessment. Medical Education 2012;46:3-12.
3. Salam A, Rabeya Y, Mahmood CB. Assessment in Medical Education. JCMCTA 2013; 12(4):357-62.
4. Epstein RM, assessment in medical education. N Engl J Med 2007;356:387-96.
5. Augarde Tony. The Oxford Guide to Word Games. Oxford: Oxford University Press;2003.
6. Gupta U, Gupta NK, Sinha P, Gupta S, Mahdi F. Creative learning using crossword puzzle as learning tool for undergraduates in obstetrics and gynecology. J Contemp Med Edu. 2015;3(1):36-9.
7. Virgin SE, Goodrow B. A community crossword puzzle. An interdisciplinary approach to community-based learning. Nurs Health Care Perspect. 1997;18(6):302-7.
8. Poston I. Crossword puzzles: Adjunct clinical teaching strategy. J Nurs Educ. 1998;37:266-7.
9. Manzar S, Al-Khusaiby SM. Crossword puzzle. A new paradigm for interactive teaching. Saudi Med J. 2004; 25:1746-7.
10. Bailey CM, Hsu CT, DiCarlo SE. Educational puzzles for understanding gastrointestinal physiology. Am J Physiol. 1999;276(6 Pt 2):S1-18.
11. Htwe TT, Sabaridah I, Rajyaguru KM, Mazidah AM. An active and easy way of learning pathology in undergraduate medical education. Singapore Med J.2012;53(2):121-3.
12. Saxena A, Nesbitt R, Pahwa P, Mill S. Crossword puzzles: Active learning in undergraduate Forensic medicine and medical education. ArchPathol Lab Med.2009;133:1457-62.
13. Bransford J, Brown A, Cocking R, Eds. How people learn: Brain, mind, experience, and school. Washington, DC: National Research Council: National Academy Press; 2001.
14. Bligh D. What's the point in discussion? Exeter, England: Intellect Books; 2000.
15. Massey AP, Brown SA, Johnston JD. It's all fun and games...until students learn. J Inf Syst Educ.2005;16:9-14.
16. Lewis DJ, Saydak SJ, Mierzwa IP, Robinson JA. Gaming: A teaching strategy for adult learners. J ContinEducNurs. 1989; 20:80-4.
17. Romano M. Crossworld: One Man's Journey into America's crossword obsession. New York, NY: Broadway; 2005.
18. Rudland JR. Learning in small groups. In: Dent JA, Harden RM, Eds. A practical guide for medical teachers. London,UK: ElsevierChurchillLivingstone.2005;57-65.
19. Crosby J. AMEE medical education guide no.8: Learning in small groups. Med Teach.1996;18:189-202.
20. Wolinsky FD, Vander Weg MW, Howden MB, Jones MP, Dotson MM. A randomized controlled trial of cognitive training using a visual speed of processing intervention in middle aged and older adults. PLoS One2013;8(5):e 61624.