

CROSS WORD PUZZLE – A CONFEDERATE ACCESSORY TEACHING TOOL FOR UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

Background: Competency-Based Medical Education (CBME) emphasizes active learning strategies that improve student engagement and knowledge retention. Traditional didactic lectures alone may not effectively stimulate interest or facilitate long-term understanding of complex terminologies. Crossword puzzles have emerged as an innovative educational tool that promotes critical thinking, recall of key concepts, and collaborative learning among students. This study aimed to evaluate the effectiveness of crossword puzzles as an accessory teaching tool for undergraduate medical students.

Materials and Methods: A cross-sectional educational intervention study was conducted among 150 Phase II MBBS students. Students were divided into 30 subgroups of five members each. After a 20-minute sensitization session on immunity, a faculty-designed crossword puzzle was provided to each group to solve collaboratively within 30 minutes. Student perception was assessed using a structured five-point Likert scale questionnaire. Knowledge retention was evaluated using a 20-item MCQ test conducted one week and one month after the activity. **Result:** Out of 150 students, 144 participated and all completed the feedback questionnaire. The majority of students strongly agreed that crossword puzzles enhanced conceptual understanding, keyword recognition, peer interaction, and learning interest. Strongly agree responses ranged from 93.2% to 97.6%. MCQ assessment showed approximately 75–80% retention of the topic after one week and one month. **Conclusion:** Crossword puzzles are an effective adjunctive teaching-learning tool that enhances engagement, promotes collaborative learning, and improves retention of microbiological concepts among undergraduate medical students.

INTRODUCTION

In the current era of Curriculum based medical education (CBME) for undergraduate MBBS students in India, conventional teaching learning methods had become outmoded. As students are having lot of distractions and deviations because of their altered mind set with the evolution of variable technologies for exploration of subject, facilitators have to shoulder the responsibility to drag the attention of the students towards the subject taught in the classroom.^[1-3]

A lot of research articles published in the recent times had shown that the implementation of active learning strategies stimulates the cognitive capabilities of the students promoting the motive towards critical thinking and swotting for better understanding of new terminologies and core

concepts in the curriculum in a playful mode. Crossword puzzle can be utilised as one of such active teaching learning strategy for incorporating certain new terminologies into the minds of students and also help them retaining the understanding of the newly learned concepts for a longer period of time.^[4,5]

The proper use of gaming methods like crossword puzzle as an adjunctive teaching tool in medical education could facilitate an additional dimension of information that could certainly finetune our upcoming Indian Medical graduates (IMG). The usage of this tool has been documented by multiple researchers from the past two decades which projected this as an exemplary teaching strategy.^[6] In this context, this study was designed to evaluate the effectiveness of crossword puzzle as an accessory

teaching tool for undergraduate medical students in the department of Microbiology.

MATERIALS AND METHODS

This is a cross-sectional study conducted in the Department of Microbiology, Mamata Academy of Medical sciences, Hyderabad, India among 150 students in Phase II MBBS for a period of 2 months after institutional ethical committee approval.

The topic chosen for the crossword puzzle is immunity from the immunology section of Microbiology as there will be lot of new terminologies that are to be introduced to the students. After an intense brain storming session, the puzzle was designed by the faculty of the department of Microbiology. [Table 1]

The study group was divided into 30 subgroups of 5 students each. Sensitization of topic basics for 20 minutes was done by the facilitator, then the subgroups were given the printed copies of Crossword puzzle to solve for 30 mins. Discussions were encouraged to solve the puzzle to promote team work as a part of collaborative learning. Students were requested to give the feedback after the session which was evaluated on a five-point Likert scale. [Table 2] The impact of the teaching method was evaluated by assessing the performance of students of both groups by an MCQ based test consisting of 20

MCQ's for 10mins, one week later and also one month after the class.



Figure 1: Puzzle solved by students



Figure 2: Students actively participating in solving the cross word puzzle.

Table 1: Cross word puzzle Design

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	I	M	M	U	N	I	T	Y	R	A	M	I	R	P	S	I
2	N	H	A	R	M	O	N	E	S	X	Q	Z	X	D	X	M
3	N	Q	W	W	U	X	V	Z	K	Q	H	N	I	P	R	M
4	A	Q	H	K	C	T	R	Q	I	W	E	O	N	R	O	U
5	T	D	C	R	O	W	Q	M	N	Z	R	X	F	E	T	N
6	E	K	L	Y	S	O	Z	Y	M	E	D	X	L	M	C	O
7	X	I	M	N	A	D	A	P	T	I	V	E	A	U	A	D
8	V	N	X	A	X	L	Q	S	E	M	E	N	M	N	F	E
9	A	F	N	D	P	O	O	T	Z	W	K	B	M	I	R	F
10	C	E	A	O	R	C	B	E	J	K	L	G	A	T	E	I
11	C	C	T	P	I	A	C	R	P	S	X	X	T	I	F	C
12	I	T	U	T	X	L	T	O	X	O	I	D	I	O	S	I
13	N	I	R	I	A	C	T	I	V	E	T	Q	O	N	N	E
14	E	O	A	V	B	P	R	D	Q	W	T	Y	N	X	A	N
15	C	N	L	E	T	Q	L	S	N	Q	P	P	M	Z	R	T
16	V	A	C	C	I	N	A	T	I	O	N	X	Z	Q	T	F

Clues:

1. Questions in Bold – you can find answers in horizontal rows.
2. Questions in italics - you can find answers in vertical columns.
3. Find One hidden word in the grid to get extra points

Table 2: Feedback questionnaire for students on Likert scale

S.no	Statement	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
1.	Cross word puzzle helped me to grasp the key words in each subtopic					
2.	This method of learning improved my ability to understand the concept					
3.	Group activity improved my communication skills and knowledge sharing with my peers					
4.	This method is useful to do in depth analysis of topic and retention of the concept for further clinical application					
5.	I will definitely suggest crossword puzzle as a teaching tool for other topics in Microbiology					
	Any other comments:					

RESULTS

On an average, students took around 20-25 minutes to solve the puzzle. Based on their performance, three groups were selected as winners. Out of the 150 students 144 students were present on the day of the activity. All the attended students responded to feedback questionnaire. Data analysis of the feedback revealed absolute contentment among students. [Figure 3]

Fifty-nine students have written additional comments regarding their opinion on this particular format of teaching learning method. Fortunately, all the comments were incontrovertible and encouraging towards this method of learning.

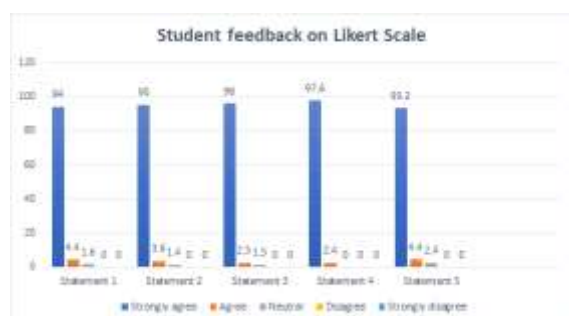


Figure 3

Most of the students mentioned that they are loving this play kind of teaching learning method. Some interesting comments from students were mentioned. “This student focused approach encouraged our team to exchange our critical thinking ideas. Expecting many more activities like this.”

“It was a real fun challenge, which made me feel like a hacker breaking the code”

“Solving the puzzle was an absolute delight for my brain. I wish this format is applied for examinations”

“The way it held all the students to a high standard is really impressive. Remembering the terminology in a play mode is jubilant”

Assessment of students performance based on MCQ’s after one week and one month showed similar results of around 75% to 80% retaining capacity of the topic.

DISCUSSION

Students in the second professional MBBS are introduced to many newer terminologies and the core concepts in Microbiology, for which they might struggle to adapt.^[7,8] The aim of the study is to embody the Crossword puzzle as a tool for enhancing the understanding of the subject proper in Microbiology. Apart from traditional teaching method, it can be used as accessory tool to revoke interest and active interaction of students with faculty and also among themselves. Solving the crossword puzzles requires the students to read through the clues, recall and review the material, and engage in discussions with their colleagues to clear any misconceptions about the topic.^[9]

The results of the study on understanding the effectiveness and student perception of crossword puzzles (75% to 80%) as a teaching tool were found to be correlating with other studies.^[9,10] Majority of the students described crossword puzzles as a unique active learning tool that helped them to learn better as they were interactive, enjoyable, and provided a change from routine monotonous didactic lectures.^[11] [Figure 1,2] Although crossword puzzle preparation is time consuming for the faculty, the intervention is easy to execute. The limitation of this study is that it is not compared with traditional teaching method which could have given more appropriate perception of the tool.

CONCLUSION

The study furnishes the insight into the unrealized advantages of harnessing interactive games in medical education especially in Microbiology to fortify concepts and phraseology in an interactive and hi-tech environment. A precisely designed format establishes a great student receptivity and engages them in dynamic learning.

To conclude, crossword puzzles can be used as confederate accessory teaching tool for enhancing students learning. Incorporation of classroom crossword puzzles brings forth a pleasant yet creative, and efficacious means to incorporate dynamic learning in undergraduate medical education including Microbiology and Immunology.

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