

Effectiveness of educational card games as a supplementary educational tool in academic performance

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Abstract

Background: Traditional lecture delivery neither helps the students in improving critical thinking nor in retaining the learned material for longer period. Educational card games helps the students to understand the basic concepts of physiology in an interactive format and improve their academic performance.

Objectives:

1. To know the students' perception of the Educational card game.
2. To study the effectiveness of Educational Card game in academic performance improvement of Nerve muscle Physiology topic for 1st MBBS students.

Methods and Material: The students played the card game like 'Rummy'. Perception of Student's regarding card game was obtained using likert scale. The students' knowledge before & after the game was assessed using class tests by Short essay questions.

Results: The results showed that there was improvement in their performance in exams after the card games.

Statistical Analysis: Student 't' test was used.

Conclusions: The study showed that the Educational card game is an effective supplementary educational tool for improving the students' ability to analyze & retain the knowledge for longer periods.

Key words: Supplementary tool; card game; Rummy

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Introduction

The current Lecture format is a passive learning for undergraduate students. There is no reinforcement for that learning. "Students learn the lecture" rather than the subject. Teaching strategies and learning tasks used in university classrooms foster intellectual passivity because they focus on presenting knowledge, rather than constructing, analyzing, synthesizing, or evaluating knowledge¹.

These strategies do not develop the students into effective learners. So, the Ideal approach is student oriented Active learning, in which the learned material can be remembered for longer periods.

Active learning strategies are widely used in both elementary and secondary educational settings and in some post-secondary and adult education because they promote learning through the active participation of the learner. Simulations, demonstrations, experiments, debates, role play, small group discussions, creating visual representations and models, problem solving,

case studies, research and presentations, and games are all examples of active learning strategies¹.

In the present study educational card game is taken for active learning since it is a fun, interactive learning tool for students². The Educational Card Games is an Educational Supplementary tool which reinforces the learning process & problem solving skills^{2,3}. However, these games are not tested to know whether there is any improvement in students' performance in the exams. Hence the current study made an attempt to assess students' academic performance after educational card games.

Objectives

To study the effectiveness of Educational Card game in understanding and academic performance improvement of Nerve muscle Physiology for 1st MBBS students.

Methods and Material

Institutional ethical clearance was obtained for study.

Procedure: A theory assessment for Nerve muscle Physiology (NMP) topic was conducted for sixty volunteers of first MBBS students of BIMS, Belagavi. This was done after completion of theory classes for the topic NMP which served as pretest. The students played the Card game after getting oriented to the rules & procedure of the game. An evaluation form² was given to know the students perception of the Card game.

Another theory assessment for the same topic was conducted after the card game.

Materials required for preparation of cards for the game: 260 blank cards of 2.0 x 3.5 inch dimensions. 130 Physiology terms (single or two words) were identified in the Nerve Muscle Physiology syllabus for 1st MBBS. On each of the card one Physiology term was printed. This was doubled making a total of 260 cards. Sixty volunteer students were divided into 10 groups randomly. For each of the group of 6 students, one set of cards were provided to play rummy. One facilitator (PG - postgraduate students) for each group were present throughout the game.

Rules & procedure of NMP Physiology Card game⁵: One player is asked to be the dealer. He/she deals 6 cards to each player. Remaining cards are placed face down in the center which makes up the deck. Player to the right of the dealer begins the game. The first player (A) chooses any opponent (B) and asks for a specific card (e.g. "Do you have Syntaxin). If B has the card, he/she gives the card to A and A gets another chance to ask another opponent for a specific card. If B does not have the named card, B says go. A draws the top card from the deck. If the requested card is drawn, A shows the card to the other players, and gets another chance. If the requested card is not drawn, A keeps the card and discards one card. The play continues to the right. As soon as a player combines a sequence of 3 / four / seven related cards, the cards are shown to other players and justifies the rationale behind the sequence. If the remaining players decide and accept the sequence, the player discards the set and takes another turn. If the players do not accept the sequence, the player keeps the cards and the game continues. Discarded cards cannot be played on. If no more cards remain on the deck, the play ends. If a time limit is set, the play ends at the stipulated time. The players must combine terms in a way that demonstrates sequences, processes or relationships of basic function of NMP.

Example of three card sequence: If a player has 3 cards with the terms – Synapse, acetylcholinesterase and synaptic cleft, the sequence is – 'In chemical synapse, the neurotransmitter Ach is destroyed by enzyme acetylcholinesterase' present in synaptic cleft. Another assessment of the same topic was conducted after 3 days of the game.

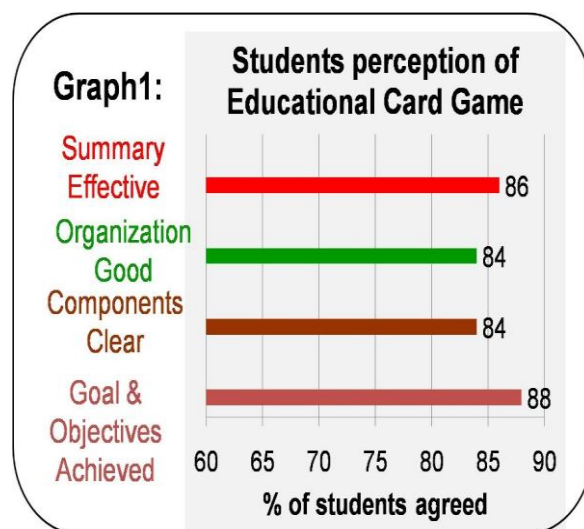
Example of five card sequence: If a player has 5 cards with the terms – Acetylcholine, Synaptic cleft, Nicotinic Ach receptors, End plate and Potential, the sequence is – Acetylcholine after its release into the synaptic cleft binds to Nicotinic Ach receptors present on motor end plate and causes end plate potential.

Data collection: i) Scores of Questionnaire (feedback) of the evaluation form after the Card game for Nerve Muscle Physiology topic (NMP). ii) Scores of Theory assessment of NMP – Before & after intervention (i.e. Card game).

Results

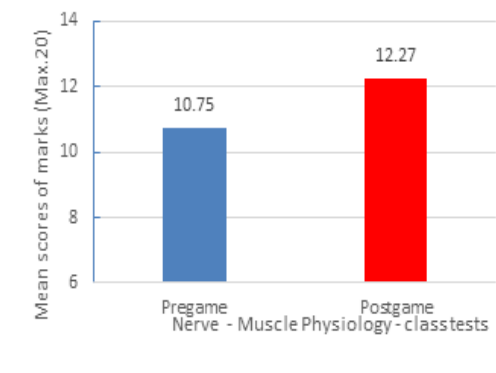
1. Results from the evaluation form shown in graph 1. Perception of Student's regarding card game was obtained using likert scale. The evaluation is divided into three main categories, goals and objectives, components and organization, and summary and recommendations (Appendix Table 1). Each of these categories had many questions. The students (88%) felt the goals & objectives of the game were met. They also felt that components were clear (84%) & the game was well organized (84%).

The scores of questionnaire of Card game showed that the game promoted their learning of NMP. It also engaged them in discussing the concepts of the topic.



Some of the responses to the specific questions were worth noting: Students (less than 20%) felt that the time limit should be maintained for each player & for the total game. We had started the game at 4.30 pm & told them that the game will be stopped after 1 hour. But the game extended for another 30 minutes extra because some students in each group wanted to complete their turn of forming the concepts. Students wanted the game for every chapter, & after a class test of that chapter.

2. Results from the Theory assessment before and after the Card game (Graph 2): Item Analysis of Theory assessment Questions of NMP (before card game) showed that all the items were good. The mean score of Theory assessment before card game was 10.75 (53.75%) and that after card game was 12.27 (61.35%). Z test was applied. $Z = 2.19 > 1.96$. So, $P < 0.05$. There was statistical significant difference in these score.

Graph 2: Comparison of mean scores of Theory assessment

Discussion

Teaching physiology, a complex and constantly evolving subject, is not a simple task. A considerable body of knowledge about cognitive processes and teaching and learning methods has accumulated over the years, helping teachers to determine the most efficient way to teach, and highlighting student's active

participation as a means to improve learning outcomes. Studies have shown that the Educational Card Game is an Educational Supplementary tool which reinforces the learning process & problem solving skills^{2,3} in a fun, interactive environment⁴. Our literature search showed that the studies are done only to know the Students' perception for the card game. However, no studies have been done to know how effective these games are in improving the academic performance. Hence the present study was planned to assess their knowledge by conducting class test before and after card games and it showed that theory assessment after the intervention was significantly higher than that of before intervention.

Conclusion

Our study shows that the Educational card game is an effective supplementary educational tool for improving the students' academic performance & ability to analyze and retain the knowledge for longer periods.

Table 1: Evaluation form for Nerve muscle Physiology²

Topic: NMP	Scale					Results
Goals and Objectives:	1	2	3	4	5	Mean +
1. The purpose and rationale for the game are fully explained	1	2	3	4	5	
2. The goals and objectives of the game are clearly defined	1	2	3	4	5	
3. The game emphasized key points of Go physiology	1	2	3	4	5	
4. The game was thought provoking	1	2	3	4	5	
5. The game encouraged student interaction	1	2	3	4	5	
6. The game promoted discussion of key topics	1	2	3	4	5	
Components and Organization:						
7. The directions were clear, concise, and easily understood	1	2	3	4	5	
8. The length of time required to play the game is reasonable	1	2	3	4	5	
9. Playing the game was an effective use of time	1	2	3	4	5	
10. The number of cards was appropriate	1	2	3	4	5	
Summary and Recommendations:						
11. The game was effective in reviewing the material	1	2	3	4	5	
12. The terms used were appropriate to my level of	1	2	3	4	5	
13. Playing the game was fun	1	2	3	4	5	
14. I would recommend the game to my peers	1	2	3	4	5	
15. Overall rating	1	2	3	4	5	
General comments: Please comment on any part of this Education tool you feel may help in its improvement.						

Students responded to the following directions – The following statements evaluate specific components of the games on a scale of 1 to 5. Please encircle the number which you feel most accurately defines each statement. Scale 1 – strongly disagree. Scale 2 – tend to disagree. Scale 3 – neither agree nor disagree. Scale 4 – tend to agree. Scale 5 – strongly agree.

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