Student Doctor Shuffle-
Applying gamification to aid development of patient scripts in medical students

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INTRODUCTION

Gamification involves applying elements of game design to increase engagement in a non-game context (1).

Applying game design element to medical education has demonstrated a potential to support learning (2,3).

Patient scripts are a concept designed to contextualise patients, combining signs, symptoms and patient characteristics with differential diagnosis and investigations (4). Development of patient scripts has been demonstrated to aid integration of new information with existing knowledge, benefiting retrieval of differential diagnosis and important red flag questions when reviewing a patient.

The card game 'Student Doctor Shuffle' aims to incorporate elements of competition, rapid feedback and clinical decision making to increase engagement and promote repetition to aid learning (2).

AIMS

To review the benefit of applying gamification to increase medical students understanding of patient scripts through engaging with a medical card game.

METHODS

Study type: Interventional Study
Location: Doncaster Royal Infirmary, Doncaster
Study cohort: 19 fourth and final year medical students
Intervention: 2 rounds of 'Student Doctor Shuffle' in groups of 4-5 with a facilitator
Data collection method: 10-point Likert scales, semi-structured group interview
Analysis: Themes were identified using AI coding through ATLAS.ti.
Statistical analysis was undertaken using Microsoft Excel software.

KEY FINDINGS

Results from 19 fourth and final year medical students demonstrates themes of 'Facilitating discussion', 'Learning from peers', 'Encouraging lateral thinking', 'Allows revision of multiple topics', and 'Competitive/ fun element'.

Much of the learning is facilitated through the 'ranking' stage of the game, where students pitch their patient script to compete to win points. This stage of the game promotes discussion between peers and encourages lateral thinking. Considering connections between cards prompted students to challenge their medical knowledge and led to comical suggestions, creating an open and fun environment for learning.

17 out of 19 participants completed Likert scales following the intervention.

- 100% of participants ranked the card game as a 'engaging' or 'very engaging' method of learning.
- 94.1% of participants ranked the statement 'The game challenged my thinking in a beneficial way' as greater than 8 out of 10 on a 10-point scale.
- 94.1% of participants ranked the statement 'I would find further game-based learning helpful for my revision' as greater than 8 out of 10 on a 10-point scale.

STUDENT FEEDBACK

'Helps you start to think about how to form a differential. Encourages you to think outside the box as you may need to for complicated patients.'

'Enjoyable way to facilitate discussion, I think the game helped to think more broadly about differentials and investigations.'

'Competition is engaging, and the randomness of the game forces you to think about unusual or uncommon scenarios.'

'Interesting hearing other people's ideas and reasoning.'

'Trying to think on my feet which I will have to do in OSCEs and on the job!'

'Enjoyed the lateral thinking aspect and interactive nature of the game.'

STUDENT DOCTOR SHUFFLE INSTRUCTIONS

Objective:
Collect a medically coherent run of cards relating to the Symptom card. To achieve the objective, the investigation, risk factor and diagnosis should all form a patient script.

Set-up:
1. Separate the cards into their respective packs- Symptoms, Risk factors, Investigations, Diagnosis, shuffle each pack and place face down on the centre of the table.
2. Each player draws 1 symptom card, and 2 risk factors, 2 investigations and 2 diagnoses to their hand, keeping their hand concealed from the other players.

Rules:
All players should keep their cards concealed from the other players.

1. Swap:
Select a card from the player to your left from the Risk Factor, Investigation or Diagnosis category. You can choose to swap this card for a card of the matching category in your hand (ie. Swap a risk factor card for a risk factor card). Discard the card you chose to swap out. NOTE: Symptom cards cannot be swapped or discarded.

2. Bank:
You may choose to 'Bank' a card. A 'Banked' card cannot be selected from you on the upcoming round. You can 'Bank' one card per round and have a maximum of 2 banked cards. You can choose to 'Unbank' a card at this point and trade for a new card.

Example Hand:

Card Types:
1. Symptom
2. Risk factor
3. Investigation
4. Diagnosis

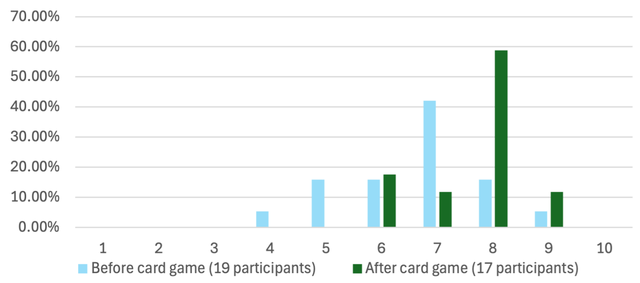
3. Draw:
The player from whom the card was selected should draw a card from the centre packs from the same category from which they lost a card.
You should have the same number of cards of each category throughout the game.

4. Justify:
If you have achieved a completed patient script, you can identify at this time and justify your script.
Skip this move if you have not yet completed your patient script.

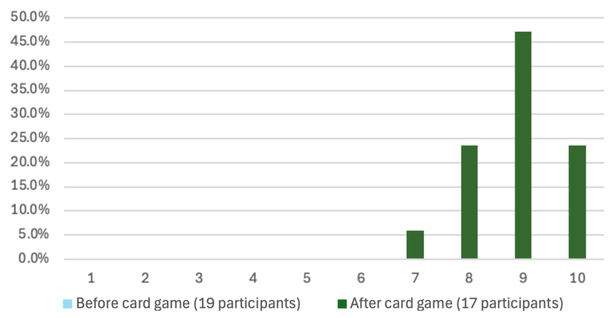
5. Rank:
If a player calls to justify their patient script, the round is terminated, and all other players will be asked to justify their partially completed patient script. The patient scripts will be ranked, with players receiving points based off the ranking received.

RESULTS

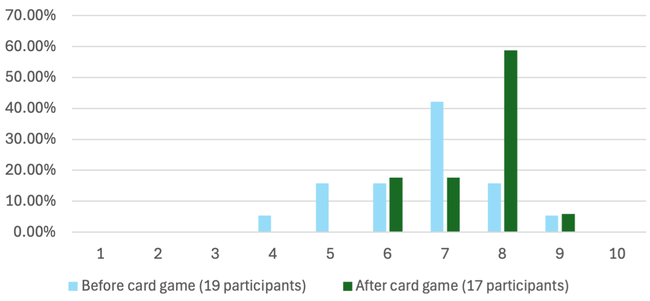
Please rate your confidence with suggesting initial investigations for common presenting symptoms.



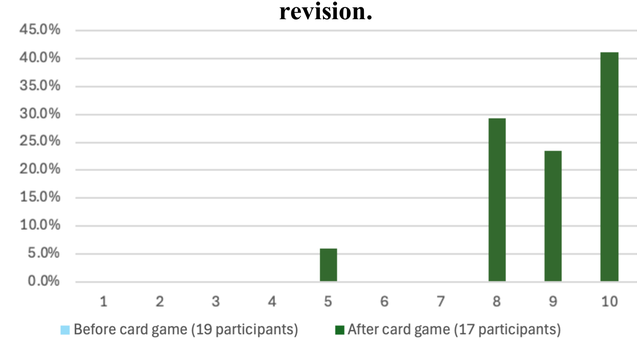
The card game challenged my thinking in a beneficial way.



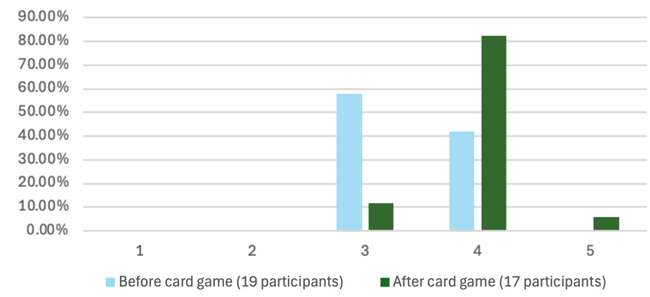
Please rate your confidence with identifying risk factors for common medical conditions.



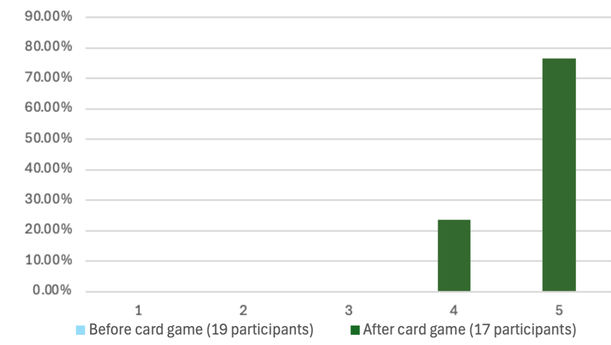
I would find further game-based learning helpful for revision.



Please rate your confidence with forming a list of differentials from a presenting symptom.



A card game is an engaging way to learn.



EXAMPLE HANDS AND RANKING

A

Dizziness could be a patient's description of pre-syncope, which could be of cardiac cause. Therefore, an ECG is required to exclude an arrhythmia such as AF. AF can lead to systolic heart failure. Co-morbidities including diabetes can pre-dispose patients to cardiovascular disease, which can also contribute to heart failure.

B

Chest pain could be a caused by an MI, therefore serial troponins should be taken to provide an indication of cardiac damage. The chest pain could be pleuritic in nature and in a patient with a background of asthma, leading to a diagnosis of a pneumothorax. Hypertension predisposes to cardiovascular disease, but the patient could also be acutely hypertensive due to pain caused by the pneumothorax.

C

An elderly patient presented with a gradual onset headaches and nausea, 2 days after an unwitnessed fall. They take apixaban for AF, therefore an MRI head is indicated to exclude intracranial bleed as no bleed was found on the initial CT head. The MRI demonstrated a subdural haemorrhage. Excessive alcohol consumption could increase the risk of falls and head injuries which increases the risk of a subdural haemorrhage.

Ranking:
A Clear patient script, with an appropriate investigation to explore the diagnosis.

C Headaches with a recent head injury on apixaban could meet criteria for imaging of the head, however a CT would initially be indicated rather than an MRI.

B Troponins could be indicated for a patient with chest pain if a history is suggestive of cardiac sounding chest pain. However, if a pneumothorax is the most likely differential a chest x-ray would be indicated and an ABG. Hypertension could increase the risk of cardiovascular disease, but this is more likely to indicate a diagnosis of ACS.

RECOMMENDATIONS AND CONCLUSIONS

This study demonstrates the benefits of incorporating elements of gamification into medical education, particularly to allow learners to develop patient scripts and consider the initial management of an acutely unwell patient. Gamification can support learning through encouraging lateral thinking, promoting discussion between peers and creating a fun and competitive environment, through which students described challenging themselves further.
Further implementation of the 'Student Doctor Shuffle' is required and additional applications of gamification in medical education should be explored.

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