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Let's Make a Deal: Gamification of Literature Searching

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Let’s Make a Deal: Gamification of literature searching

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01

EMBEDDING INTO THE CURRICULUM

Introduction to Drug Information

02

GAMIFICATION OF LITERATURE SEARCHING

Let's make it fun!

03

OUTCOMES AND FUTURE STEPS

Was it effective?

01

EMBEDDING INTO THE CURRICULUM

INTRODUCTION TO DRUG INFORMATION

Fully embedded into Introduction to Drug Information
a pass-fail course in the P1 year

Fully flipped classroom:
Pre-class videos and pre-class handouts
In-class active learning

Librarian teaches mobile applications (already
gamified), and literature searching in PubMed

Literature searching assignment: record a literature
search to answer a drug information question

BASIC LITERATURE SEARCHING

First week

- Intro to PubMed and MeSH
- Boolean Operators
- Basic searching techniques
- In-class worked through a case handout

ADVANCED LITERATURE SEARCHING

Second week

- Advanced searching techniques
- Truncation, phrase searching, etc
- MeSH subheadings and advanced features
- In-class worked through a case handout building on week 1

“Play more bingo games or even kahoot, makes learning fun and the information retainable”

—STUDENT FEEDBACK IN 2021

02

GAMIFICATION OF LITERATURE SEARCHING

EXISTING ACTIVE LEARNING HANDOUT

Learning Activities:

- Access PubMed®
- Conduct the basic literature searches described in this handout in PubMed® during the lecture

Case: A physician calls you with a drug information question. His patient, Michelle, a 27-year-old female in good health, is taking a trip to Colorado to visit friends and go hiking. Her friends want to take her on a hike of Mount Elbert, one of the "14ers" near Denver. Michelle has lived in Charleston, SC her entire life, and while she is in good health, she is concerned about the possibility of Mountain Sickness. Her friends in Colorado said many out-of-towners are prescribed acetazolamide, the standard preventative treatment, but Michelle is concerned about adverse reactions. Her trainer said he took gingko while on a climbing trip a year before and Michelle asks her physician if this is an acceptable alternative therapy. The physician does not know and calls you for help.

Pre-class Work:

1. What are the concepts and keywords relevant to the scenario? (order does not matter)

a. Concept 1=
b. Concept 2=
c. Concept 3=

2. Use the keywords identified in the step above and search PubMed's® MeSH database. What are the MeSH terms that represent the keywords you identified?

Concepts	MeSH Term

3. Write down any other synonyms or like terms you can think of for each MeSH term.

MeSH Term	Synonyms/Like Terms

4. Draw an arrow and match each Boolean operator to the corresponding description.

a. AND — i. Used to connect like terms or synonyms
b. OR — ii. Used to connect different concepts; retrieves results indexed to all concepts in the same record

During Lecture

Part 1: PubMed

5. Search each MeSH term individually in PubMed. How many results do you retrieve for each MeSH term? (make sure results are sorted by most recent)

MeSH Term	Number of results

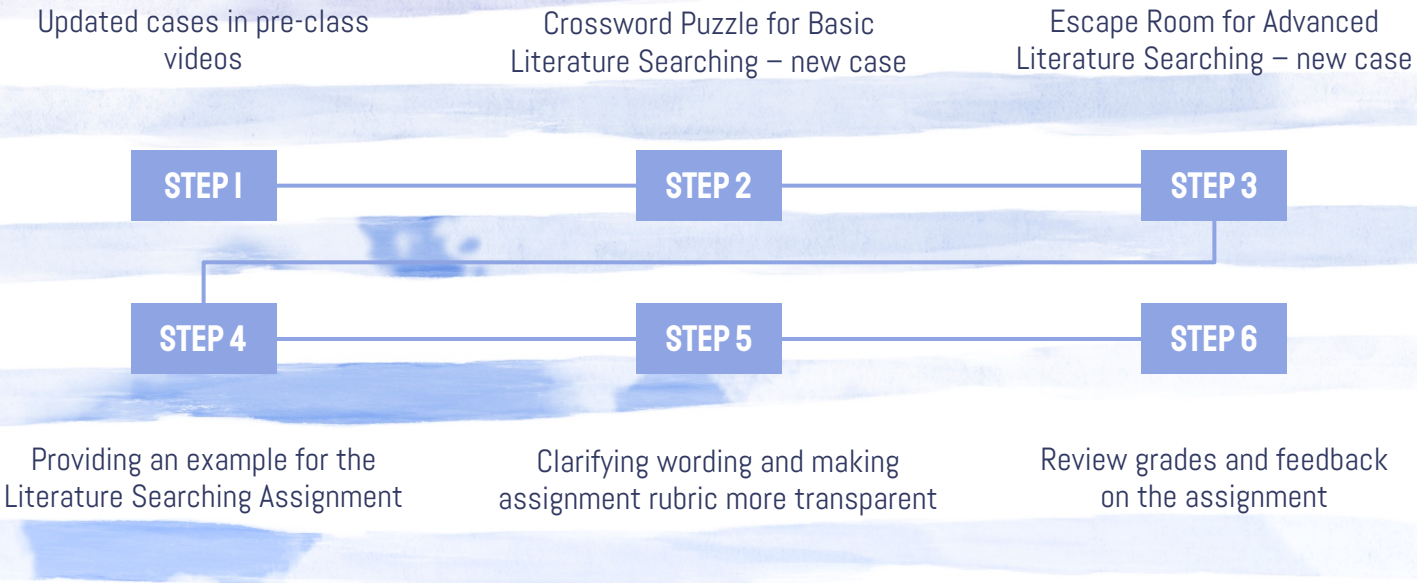
6. Combine each MeSH term with Boolean operator _____ (hint: you want to retrieve results indexed to all 3 terms in each record). How many results do you retrieve?

7. Go back to the advanced search screen. Conduct keyword searches for each concept. Record the terms used and number of results in the table below.

Concept	Keyword terms	Connect terms on each row with Boolean Operator	Number of results for each search
		OR	
		OR	
		OR	

8. Connect each of the keyword concept searches together with AND. How many results do you retrieve?

IMPLEMENTING THE GAMIFICATION



CROSSWORD PUZZLE

- Created via AmuseLabs / PuzzleMe
  - https://amuselabs.com/
- Pre-class handout introduced case for in-class activity
  - Expected to come to class with keywords/concepts and MeSH terms
- In-class group activity
  - Told to work together in groups of 5-6
- Prize
  - The group that completed the crossword puzzle first won a prize

CROSSWORD PUZZLE

Case: A physician calls you with a drug information question. His patient, Samantha, is a 62-year-old female with newly diagnosed Type II diabetes. The patient is resistant to taking any additional medications and states her friend from bridge club told her she could just take cinnamon capsules every day and that will fix her sugar numbers. The physician does not know and is calling hoping for your assistance in finding whether or not this is true.

CROSSWORD PUZZLE

ACROSS

4 When you search the MeSH term for diabetes (refer to 2 down) individually in PubMed, how many results do you retrieve? (round to the nearest thousand)

5 The terms found _____ cinnamon in the MeSH tree are more broad.

7 What is the MeSH term for diabetes? (hint: is there a specific type of diabetes our patient has been diagnosed with)

10 When you search the MeSH term for cinnamon individually in PubMed, how many results do you retrieve? (round to the nearest thousand)

11 The term(s) found _____ diabetes in the MeSH tree are more narrow

13 Conduct a non-indexed citation search for cinnamon OR Cinnamomum zeylanicum - record the number of results (round to the nearest thousand)

14 Conduct a non-indexed citation search for type 2 diabetes OR T2DM - record the number of results (round to the nearest thousand)

DOWN

1 Conduct a non-indexed citation search for blood sugar OR blood glucose - record the number of results (round to the nearest thousand)

2 When you search the MeSH term for blood sugar individually in PubMed, how many results do you retrieve? (round to the nearest thousand)

3 What is the MeSH term for cinnamon?

6 What type of search do you perform to find non-indexed citations?

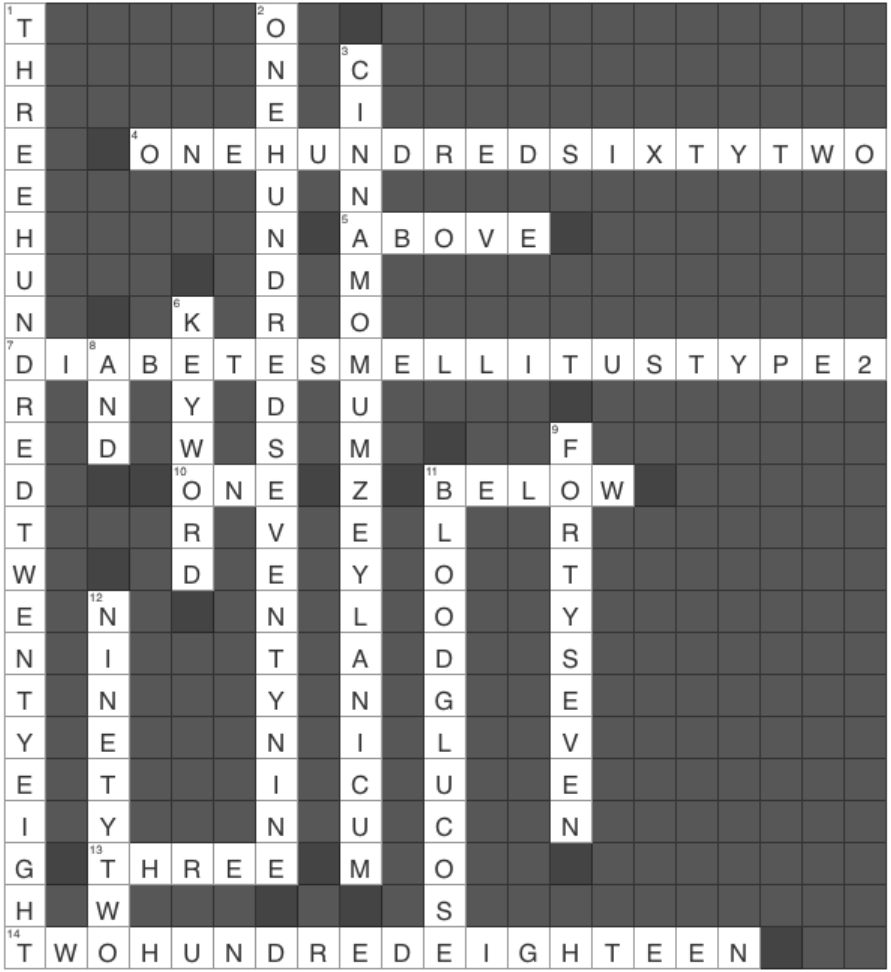
8 What boolean operator would you use combine all three MeSH terms with? (Hint: your terms from #2, #4, #10)

9 How many results do you retrieve when you combine all three MeSH terms? (Hint: your searches from #2, #4, #10)

11 What is the MeSH term for blood sugar?

12 Combine all three non-indexed citation searches - how many results do you retrieve? (Hint: your searches from #1, #13, #14)

CROSSWORD PUZZLE



Intro to DI Basic Literature Searching 2022 (15 clues in a 21x23 grid)

By Rachel Whitney

ESCAPE ROOM

- Created via Google Forms
  - Went back and forth between this and Microsoft
- Pre-class videos and quiz only, no handout
- Case was provided in the escape room activity
  - Halloween/spooky themed
  - Same case as crossword!
- In-class group activity
  - Told to work together in groups of 5-6
- Prize
  - The group that completed the escape room first won a prize

ESCAPE ROOM

Literature Searching Escape Room

This virtual escape room will give you practice using PubMed. There are 4 "locks" to get through. Each one has a series of questions, which will help you come up with a keycode. If you get the keycode correct, the form will proceed to the next lock.

You were studying in the library study rooms the week before Halloween late at night and fell asleep at your desk. When you wake up you realized that you are no longer in the library study rooms. Instead, you are in what appears to be an abandoned hospital room, straight out of a horror movie. You find yourself in this room with several of your fellow P1 students.

Your task is to work together as a team to escape this abandoned hospital. Each section focuses on an aspect of PubMed we discussed in the pre-class videos. Use what you learned to explore PubMed and the clues to opening each lock. Good luck!

[Note: The pictures used throughout the activity have no relation to the clues or keycodes - they are just for atmosphere!]

Escape if you dare

Lock 1: Advanced MeSH searching

As you move towards the door, you notice it is locked with a padlock. On the back of the padlock is a piece of paper with the following information on it:

"A physician calls you with a drug information question. His patient, Samantha, is a 62-year-old female with newly diagnosed Type II diabetes. The patient is resistant to taking any additional medications and states her friend from bridge club told her she could just take cinnamon capsules every day and that will fix her sugar numbers. The physician does not know and is calling hoping for your assistance in finding whether or not this is true."

Below the paragraph is a list of questions. You recognize this case from what you learned in class a few weeks ago and know that you likely need to go to PubMed and the MeSH database in order to answer the questions. You find a pencil on the floor to write down your answers as you go.

(Hint: In order to unlock the padlock you have to perform the following searches in PubMed, and then add them all together)

ESCAPE ROOM

Lock 1: Advanced MeSH Searching

Search the MeSH term for type 2 diabetes, and restrict to MeSH Major Topic. How many results do you retrieve?

Search the MeSH term for cinnamon and apply the therapeutic use subheading. How many results do you retrieve?

Search the MeSH term for blood sugar without adding any advanced search techniques. How many results
do you retrieve?

Keycode (Add the results together, 6 Digits) *

Your answer

Perform the following PubMed search: "blood sugar" OR "blood glucose"
Which of these is closest to the number of results you retrieve?

- I: 229,201
- J: 328,530
- K: 9,524
- L: 500,079

Can you perform a wildcard search in PubMed?

- M: Yes
- N: No

Keycode: (4 letters) *

Your answer

03

OUTCOMES AND FUTURE STEPS

OUTCOMES

Student feedback:

- Positive after each of the sessions
- End of Year Evaluations: students stated that they enjoyed the gamification (and even asked for more games and group work)

Literature Searching Assignment:

- Students scored higher on this assignment in 2022 (avg = 90.13%) compared to in 2021 (avg = 79.93%)
- I received fewer emails asking for clarification or requesting to meet (2021 n=22, 2022 n=7)

LESSONS LEARNED AND FUTURE STEPS

Lessons Learned:

- A lot of work upfront, less work to update each year
- Some groups finished the activities a lot faster than others
- Important to incorporate built-in time to review the answers to each game, even if not every team is done

Future Steps:

- Incorporating more transparency in activity instructions (ex: clarity on how to input numbers into crossword)
- Randomly assigning groups instead of letting students pick their own groups
- Research project to investigate incentives for watching the pre-class videos

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THANKS!

Do you have any questions?

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