

Write to Learn: Multiple-Choice Question Generation as an Active Learning Strategy

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Introduction

- **Concept:** Students collaboratively write & develop multiple-choice questions (MCQs) after presented lecture content
- **Steps:**
 1. Students receive **lecture** content
 2. Students divide into **small groups** (3-5 people)
 3. Students are assigned **a specific topic** from lecture & **create** an **MCQ**
 4. Faculty provide **formative feedback** on clarity, relevance, &

Background & Rationale¹⁻⁸

- **Challenges:**

- Traditional lecture may promote **passive learning & short-term** retention
- **Students** often **prefer passive learning**

- **Research:**

- Increasingly recognizing **active learning** □ **improved engagement & retention**
- **MCQ generation** has shown **promise** in undergraduate, nursing, & medical students

- **Why MCQs?**

- It encourages **higher-order thinking & it's active!**

Interventional Design

- Course context: PAS 6637 Gastroenterology lecture on "*Upper GI Disorders & GI Bleeds*" (3 hours)
- Structure
 - 70-minute **lecture** on esophageal diseases
 - Students worked in **small groups**
 - At the end, a low-stakes ExamNow **formative quiz** was given covering ALL lecture-covered instructional objectives

Using Google Docs

Esophageal Disorders Practice Multiple Choice Question Writing ☆ 📎 ☁

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- ☰ Pocatello Group A ⋮
- ☰ Pocatello Group B
- ☰ Meridian Group A
- ☰ Meridian Group B
- ☰ Caldwell
- ☰ Zoom

Student responses please start on the next page.

Instructions: Pocatello Group A (front half of the classroom) write a multiple choice question about **GERD** work-up or treatment below.

Reminders:

- Work in groups of **3-5** people (you choose)
- Write **one multiple-choice question** on the (above) assigned topic per group
- We will take **15 minutes** to create your question with **3-5 answer options**, with **only one correct answer**
- Be sure to **reference your source!** Make sure it is a **reliable** source (*i.e. NIH STAT pearls, Merck manual, CMDT, etc.*)

Example Multiple Choice Question:

1. A 55-year-old male with a history of alcohol-related liver disease presents to the emergency department with hematemesis and melena. He reports increasing fatigue and abdominal distension over the past month. On physical exam, he has scleral icterus, palmar erythema, and a distended abdomen with a positive fluid wave. His vital signs show hypotension and tachycardia. Which of the following is the most appropriate initial diagnostic test?

A) Barium swallow
B) Esophageal manometry
C) Upper endoscopy
D) Abdominal ultrasound
E) Capsule endoscopy

Correct Answer: C) Upper endoscopy

Reference

1. Meseeha M, Attia M. Esophageal varices. *NIH StatPearls*. Accessed March 24, 2025. <http://www.ncbi.nlm.nih.gov/books/NBK448078/>

Student Generated MCQs^{4, 7-8}

Document tabs



Pocatello Group A



Pocatello Group B

Meridian Group A

Meridian Group B

Caldwell

Zoom

Group1:

Names: Jon, Elizabeth., Alex., Ailee

Response:

CC: chest pain and hoarseness

A 35-year-old male presents to urgent care, feeling like he is having a heart attack after eating spicy chicken wings. He reports that this commonly happens after eating spicy food. He works in construction and takes NSAIDs daily to deal with chronic back pain from his job. He reports a family history of Hashimoto's thyroiditis in his mother. His father died from an MI at age 40. EKG, troponins, and BNP are all unremarkable. Which of the following is the most appropriate next step for this patient?

- A) Nitroglycerin
- B) Reassurance
- C) Upper GI series
- D) Omeprazole

Correct Answer: D) Omeprazole

Reference:

<https://www.merckmanuals.com/professional/pediatrics/gastrointestinal-disorders-in-neonates-and-infants/gastroesophageal-reflux-in-infants>

DY24 vs DY25 Quiz Outcomes

Metric	2024 (No Intervention)	2025 (+ MCQ Intervention)
Mean Score	64%	78%
Median Score	70%	80%
Low Score	0%	20%
High Score	100% (1 student)	100% (8 students)
Participation	44/73= 60.3%	60/69= 87%

Results Summary

- **Engagement:** Strong student participation in the activity & quiz
- **Formative Quiz Performance** (10 questions): Better performance in ALL categories
- This demonstrated early evidence of **improved knowledge retention**
- All MCQs were subsequently **reviewed & edited** by faculty
- Students were able to use the MCQs as a **study guide** for their **summative exam**

Implications¹⁻⁸



Student-generated MCQs may:

- Reinforce learning
- Improve exam performance
- Foster confidence & engagement



Feasible & scalable in health professions education

Potential Barriers & Challenges¹⁻⁹



TIME
CONSTRAIN
TS



COGNITIVE
LOAD



FACULTY
OVERSIGHT



STUDENT
BUY-IN



TECHNOLOG
Y LOGISTICS

Future Directions

01

CAN BE
EXPANDED
ACROSS
MODULES &
OTHER FACULTY

02

ASSESS IMPACT
ON STUDENTS'
HIGH-STAKES
NATIONAL
EXAMINATION
PERFORMANCE

03

EXPLORE
FACULTY &
STUDENTS'
PERCEPTIONS

Key Takeaways for Educators



This strategy can **enhance learners' engagement, retention, & performance**



MCQs as an active learning strategy is **practical & adaptable** beyond the PA classroom



Generating MCQs = **learning tool**

References

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2. Brown PC, Roediger HL, McDaniel MA. *Make It Stick: The Science of Successful Learning*. Belknap Press; 2014.
3. Bucklin BA, Asdigian NL, Hawkins JL, Klein U. Making it stick: use of active learning strategies in continuing medical education. *BMC Med Educ*. 2021;21:44. doi:10.1186/s12909-020-02447-0
4. Kurtz J, Holman B, Monrad SU. Training medical students to create and collaboratively review multiple-choice questions: a comprehensive workshop. *MedEdPORTAL*. 2020;16:10986. doi:10.15766/mep_2374-8265.10986
5. Lahti J, Salamon M, Farhat J, Varkey T. Multiple choice question writing and medical students: a systematic literature review. *MedEdPublish*. 2023;13(34):34. doi:10.12688/mep.19635.1
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Questions

