

QuizCram: A Question-Driven Video Study Interface

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1. How can online lectures be improved?

- Eliminate the need to seek to and from in-video quizzes
In-video quizzes are the most common seek destination in Coursera lectures
Users often skip forward to quizzes, or from one quiz to the next
- Increase emphasis on testing and review
Repeated testing and spaced review improves retention
However, MOOC users primarily watch videos, don't do problems or exams
Only 11% of users who finish watching a lecture ever open it again

2. QuizCram: Question-Driven Video Viewing

- Shows a question associated with each part of the video
If you know the answer, answer question to navigate to the next section
- Review using a timeline of past questions and videos
Can refer back to past questions, or resume watching a previous video
- Keeps track of seen parts and suggests parts to review
Suggestions based on past performance, parts seen and recency of review
- Can be automatically generated from in-video quizzes
Can also add additional questions for a more quiz-driven experience

3. User Study: QuizCram vs In-Video Quizzes

- Within-subjects study over 2 days with 18 participants
- Materials from Neurobiology course on Coursera
2 parts, each with 5 videos, 9 in-video quizzes, and unit exam

Question 3 of 18
The Four Functions, part 3/4
Which of the following are influenced by homeostatic brain functions?

- ☐ Breathing
- ☐ Blood pressure
- ☐ Sleeping
- ☐ Eating
- ☐ Digestion

check answer



Question 2 of 18
The Four Functions, part 2/4
Which of the following stimuli are sensed but not perceived?

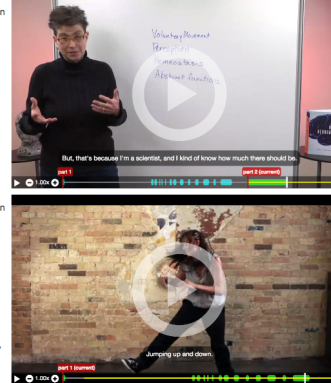
- ☒ An increase in blood oxygen concentration
- ☒ Lung pressure
- ☐ Vibration
- ☐ Skin incision
- ☐ Skin warming

Correct Our bodies are able to detect things (like carbon dioxide concentration in the blood) that we are not able to perceive. Perceivable stimuli are those we are capable of being aware of.

Question 1 of 18
The Four Functions, part 1/4
Which of the following are voluntary movements?

- ☒ Breathing
- ☒ Laughing at a joke
- ☒ Crying when you hear bad news
- ☐ Pumping blood through the circulatory system
- ☐ Moving food through the intestinal tract

Correct Voluntary movements are self-generated actions driven by the brain. These can be deliberate movements or emotional reactions.



Progressbar shows
seen parts of video
and parts relevant to
the question

Timeline of past videos
and questions allows
easy navigation and
review

4. Study Procedure

Day 1: Study both sets of videos for 40 minutes, one with each tool
Day 2: Take a set of exams on the studied materials
Unit exams, in-video quizzes, extra multiple-checkbox and free-response questions

5. Results: improved retention on in-video questions and more questions reviewed with QuizCram

Exam scores showed improved retention on in-video questions

Exam	QuizCram	In-Video	Statistically significant?
Original in-video questions	85.4%	81.3%	Yes ($t=2.24$, $p=0.039$)
Original unit exam	65.1%	63.4%	No ($t=0.44$, $p=0.669$)
Extra multiple-checkbox questions	85.5%	76.0%	Yes ($t=2.44$, $p=0.026$)
Extra free-response questions	67.6%	49.0%	Yes ($t=3.95$, $p=0.001$)

Logs showed that users answered and reviewed questions more with QuizCram

Logged Event Type	QuizCram	In-Video	Statistically Significant?
Original in-video questions answered	22.3	13.5	Yes ($t=3.22$, $p=0.008$)
Original in-video questions answered correctly	13.8 (62%)	5.3 (40%)	Yes ($t=4.62$, $p=0.0007$)
Original in-video questions re-answered (after at least 1 minute)	9	0.17	Yes ($t=5.00$, $p=0.0004$)
Number of seek events	7.2	11.9	No ($t=-0.82$, $p=0.43$)