QuizCram: A Question-Driven Video Study Interface

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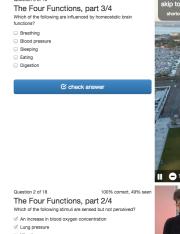## 1. How can online lectures be improved?

- **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

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

Timeline of past videos and questions allows easy navigation and review

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

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)