Understanding the Effect of In-Video Prompting on Learners and Instructors

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It tends to be a useful way of doing it.
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How well are learners following the lecture?
4m, 4.2m, 5m, 4.3m, 5.5m

μ = 4.6m

It tends to be a useful way of doing it.

How well are learners following the lecture?

How learners perceive the lecture?
Discussion forums

Why linear regression a convex optimization problem??

Mentor Replied  Last post by

Gradient descent

Last post by

How is the cost function a function of parameter theta1

Mentor Replied  Last post by

Why do we have to square the difference between the calculated result \[ h_\theta(x^i) \] and the actual result \[ y^i \].

Mentor Replied  Last post by
Review websites

17 May 2016

They jump around too much and it is very hard to follow. Often I feel like I missed out on content.

16 May 2016

I thought you would learn how to actually create a website, not just how to pick and install a premade wordpress theme.

4 May 2016
In-video prompting

4m, 4.2m, 5m, 4.3m, 5.5m

μ =
Q. Describe how to calculate mean. You may assume you want to calculate a mean of five numbers.
Q. Describe how to calculate mean. You may assume you want to calculate a mean of five numbers.

Add up all the numbers and then divide them by the total number of objects you are adding.
Properties of in-video prompting
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• All learners encounter the prompts, which is likely to yield a high response rate
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• In-video prompting can ask specific questions to learners
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• All learners encounter the prompts, which is likely to yield a high response rate

• In-video prompting can ask specific questions to learners

• Prompting at an inopportune time might distract learners
Which of the following is **NOT** a category of game elements?

- [ ] Dynamics
- [x] Mechanics
- [ ] Aesthetics
- [ ] Components
Kinetic Energy (KE)

• Energy due to motion
• KE = \frac{1}{2}mv^2
• KE = kinetic energy
• \( m \) = mass
• \( v \) = velocity

Unit
\( J = \text{Joule} \)
\( kg \)
\( m/sec \)

Why is this *particular* point unclear?

Why is "P" used? What does it stand for?

Mudslide

Elena L. Glassman et al., CHI 2015
Little research has investigated the design space of in-video prompts.
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The design space of in-video prompting questions
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(A): Describe what you have learned so far

(B): Describe something unsatisfying about the lecture so far
The design space of in-video prompting questions

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(A): Describe what you have learned so far

(C): Describe how to calculate the standard deviation
The design space of in-video prompting questions

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Research questions

1. What are learners’ perceptions of in-video prompting?

2. How do different in-video prompting questions affect the learning experience?

3. How useful are learner responses to in-video prompts as feedback to instructors?
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Study 1. Learners’ perceptions
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- Video 1: 8 minutes
- Video 2: 8 minutes
- Survey
Study 1. Learners’ perceptions

The order of presentation topic was counterbalanced.

Time

- Video 1: 8 minutes
- Video 2: 8 minutes
- Survey
Study 1. Learners’ perceptions

The order of presentation topic and pairing of prompting condition was counterbalanced.

<table>
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<th>Video 2</th>
<th>Survey</th>
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<td></td>
<td>8 minutes</td>
<td>8 minutes</td>
<td></td>
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Study 1. Learners’ perceptions

The order of presentation topic, pairing of prompting condition, and prompting questions was counterbalanced.

- Video 1: 8 minutes
- Video 2: 8 minutes
- Survey

Time
Study 1. Learners’ perceptions

The order of presentation topic pairing of prompting condition prompting questions was counterbalanced.

Pretest Video 1 Posttest
8 minutes

Pretest Video 2 Posttest
8 minutes

Survey

Time
Study 1. Learners’ perceptions

100 participants on Amazon Mechanical Turk

The order of presentation topic, pairing of prompting condition, prompting questions was counterbalanced.

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Pros of in-video prompting

• Enhance learners’ concentration
• Encourage reflection
• Split the lecture into small pieces
• Help grasp key concepts
• Provide interactivity
Pros of in-video prompting

• **Enhance learners’ concentration**
• Encourage reflection
• Split the lecture into small pieces
• Help grasp key concepts
• Provide interactivity

“the prompts gave me a good attention check to make sure I understood what was being discussed.”
Pros of in-video prompting

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Pros of in-video prompting

- Enhance learners’ concentration
- Encourage reflection
- Split the lecture into small pieces
- Help grasp key concepts
- Provide interactivity

“Having a prompt helps to indicate exactly what the key concept was so you can take a moment and decide if you fully understand it.”
Pros of in-video prompting

- Enhance learners’ concentration
- Encourage reflection
- Split the lecture into small pieces
- Help grasp key concepts
- **Provide interactivity**

“I think prompts make videos more **hands-on and interactive** and deliver a more educational experience.”
Cons of in-video prompting

- Distract from the learning process
- Provide no feedback on responses
- Cause anxiety
Cons of in-video prompting

- Distract from the learning process
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- Cause anxiety

“it might cause you to lose focus on the material in the video by breaking your chain of thought because you are basically being interrupted.”
Cons of in-video prompting

- Distract from the learning process
- **Provide no feedback on responses**
- Cause anxiety

“**there is no feedback** so even if I answer the prompt question and I’m confident, I may be wrong.”
Cons of in-video prompting

• Distract from the learning process
• Provide no feedback on responses
• Cause anxiety

“I felt frustrated that it appeared difficult for me to explain what I learned thus far.”
### Study 2. Effects of different prompting strategies

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Study 2. Effects of different prompting strategies
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Prompting strategies were randomly assigned

Time

Pretest  Video  Posttest  Survey
8 minutes
Study 2. Effects of different prompting strategies

Prompting strategies were randomly assigned

200 participants on Amazon Mechanical Turk
Study 2. Effects of different prompting strategies

Promoting strategies were randomly assigned

200 participants on Amazon Mechanical Turk

“Prompting made me worried about giving inappropriate responses”
Learners found comprehension-centered questions less interruptive, more enjoyable, more helpful than experience-centered questions.
Low-performing group had more cognitive load on prompts

(score 1-100)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Co-Sp</td>
<td>79.6</td>
<td>76.2</td>
</tr>
<tr>
<td>Co-Ge</td>
<td>79.4</td>
<td>58.9</td>
</tr>
<tr>
<td>Ex-Sp</td>
<td>77.9</td>
<td>68.5</td>
</tr>
<tr>
<td>Ex-Ge</td>
<td>75.8</td>
<td>57.2</td>
</tr>
</tbody>
</table>
The level of specificity gave different effects on the groups

“Prompting made me worried about giving inappropriate responses”

(score 1-7)

Co-Sp: 4.25 (Low) 2.95 (High)
Co-Ge: 3.28 (Low) 3.71 (High)
Ex-Sp: 3.78 (Low) 3.13 (High)
Ex-Ge: 3.47 (Low) 3.90 (High)
Instructors preferred experience-centered questions
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- Comprehension-centered vs. Experience-centered
  - Experience-centered questions give more **actionable feedback**

“I did not like how the screen was black for most of the explanation”

“Lecturer never clearly defined variance”

“The instructor’s handwriting is a little bad”
Instructors preferred experience-centered questions

• Comprehension-centered vs. Experience-centered
  • Experience-centered questions give more actionable feedback

• Learner responses on in-video prompting were specific
Discussion

• Trade-off between prompting strategies

• Trade-off between questions and responses for instructors
Discussion

• Trade-off between prompting strategies
  • Comprehension-centered was better for learners,
    whereas experience-centered was better for instructors

• Trade-off between questions and responses for instructors
Discussion

• Trade-off between prompting strategies
  • Comprehension-centered was better for learners, whereas experience-centered was better for instructors

• Trade-off between questions and responses for instructors
  • Specific prompting tends to yield more specific responses, but it is more expensive to design
Future work

- Designing personalized in-video prompts
Describe what you have learned so far.
We need to further explore the design space of in-video prompting.
Conclusion

• We investigated the effects of in-video prompting on both learners and instructors

• Comprehension-centered questions are less interruptive, more enjoyable, and more helpful for learners

• Experience-centered questions give more actionable feedback for instructors

We need to further explore the design space of in-video prompting