Using Time-Anchored Peer Comments to Enhance Social Interaction in Online Educational Videos

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Online Education
Online Education

Self Education
Online Education

Self Education

Flipped Classroom

In Class

Out of Class
Online Education

- Lack of **Social** Interaction
- **Hinder** Learning Performance

[cf. Kizilcec et al., 2014; Abrami, P. C et al., 2001;27]
Synchronous Chatroom

Amy: Hi.
Ben: Hello!
Shelly: Haha.
Amy: :) 
Ben: :( 

Asynchronous Discussion Board
Synchronous

Chatroom

- Amy: Hi.
- Ben: Hello!
- Shelly: Haha.
- Amy: :)
- Ben: :( 

Lack of Deep Reflection
Various Time Zone

Asynchronous

Discussion Board

Lack of Immediate Feedback
Few Learner Engagement

[cf. Huang, J et al., 2014; Branon, R. F et al., 2001]
Time-Anchored Comment

Lack of Deep Reflection
Various Time Zone

Synchronous
Chatroom

Asynchronous
Discussion Board

[cf. Huang, J et al., 2014; Branon, R. F et al., 2001]
Time-Anchored Comment
Time-Anchored Comment

I feel ...
Time-Anchored Comment

I feel ...
Time-Anchored Comment
Time-Anchored Comment

I feel ...
Online Education
Time-Anchored Comment + Online Educational Video
Time-Anchored Comment + Online Educational Video

Experiment
Research Hypotheses

Experiment

Time-Anchored Comment

Online Educational Video

Research Hypotheses
Research Hypothesis #1

Time-anchored comments enhance perceived engagement.

This effect is more marked as the number of content-related comments increases.
Dynamically displaying comments enhance perceived social interactivity and make learners leave more comments.
Research Hypothesis #3

Content-related comments result in better learning outcomes than social-oriented comments.
Experimental Design

Stage A

• 50 Participants
• Complete 3 Course Videos Online
• Collect Comments
Experimental Design

Stage A

- 50 Participants
- Complete 3 Course Videos Online
- Collect Comments

<table>
<thead>
<tr>
<th>Course</th>
<th>Number of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neural Science</td>
<td>430</td>
</tr>
<tr>
<td>Economics</td>
<td>420</td>
</tr>
<tr>
<td>Philosophy</td>
<td>427</td>
</tr>
</tbody>
</table>
Experimental Design

Stage B

- 52 Participants
- Complete 3 Course Videos in Lab
- Factors: Comment Type & Display Type
Comment Type

**Content-Related**
- Note, Question, Opinion…
- “Law of demand: …”
  (Economics Course)

**Social-Oriented**
- Off-topic conversation, Joke,…
- “The instructor could speak slowly.”
  (Neural Science Course)
Display Type

Static Display
Experiment Conditions

Comment Type × Display Type
Experiment Conditions

Comment Type × Display Type

- Dynamic Social-oriented
- Dynamic Content-related
- Static Social-oriented
- Static Content-related

Baseline
No Comment
Experiment Conditions

Comment Type × Display Type

- Dynamic Social-oriented
- Dynamic Content-related
- Static Social-oriented
- Static Content-related
- Baseline No Comment

Measure Participants’ Experience
Measure

Questionnaire

• After Watching Video

Perceived Social Interactivity
I feel attached to these people who interact on this video course

Perceived Engagement
[cf. O’Brien, H. L. et al., 2010]
I was so involved in this course that I lost track of time.

Strongly Disagree

Strongly Agree
Learning Outcomes

• Pretest & Posttest
• Questions From Course Content

What is Reward System?
Please give a brief explanation.
(Neural Science Course)

What is Law of Demand?
Please give a brief explanation.
(Economics Course)
Experiment Procedure

Pretest
Experiment Procedure

5 Conditions

Randomly assigned to each participant with equal probability
Experiment Procedure

Pretest

Posttest

Questionnaire
Experiment Procedure

- Pretest
- Posttest
- Questionnaire
- Interview
Results
Whether time-anchored comments made the learners perceive more **engagement**?
Comments enhanced perceived engagement.

<table>
<thead>
<tr>
<th>Mean Score</th>
<th>No Comment</th>
<th>Time-Anchored Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.74</td>
<td>* 3.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.38</td>
</tr>
</tbody>
</table>
What is the influence of display type on participants’ perceived social interactivity?
Dynamic display enhanced perceived social interactivity.

**Mean Score**

- Dynamic: 3.57
- Static: 3.23
Whether time-anchored comments could help participants to learn better?
Comments didn’t hinder learning outcomes.

<table>
<thead>
<tr>
<th>Mean Score of Posttest</th>
<th>No Comment</th>
<th>Dynamic Content</th>
<th>Dynamic Social</th>
<th>Static Content</th>
<th>Static Social</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52.4%</td>
<td>66.7%</td>
<td>67.0%</td>
<td>70.0%</td>
<td>65.5%</td>
</tr>
</tbody>
</table>

Comments didn’t hinder learning outcomes.
Statically displaying content-related comments enhanced learning outcomes.

Mean Score of Posttest

- No Comment: 52.4%
- Dynamic Content
- Dynamic Social
- Static Content: 70.0%
- Static Social

[cf. Anderson, T. et al., 2008; Bransford, J. D. et al., 2000]
How the experimental factors influence the participants’ commenting behaviors?
Display Type didn’t affect intention to leave comments.
Social-oriented comments increased intention to leave comment.
Social-oriented comments didn’t distract learners from leaving content-related comments.
Design Implications

- Perceived Engagement
- Perceived Social Interactivity
- Learning Outcomes
- Comment Number
Design Implication #1

Video-centered, time-anchored comments exchange supports collaborative learning.

Learning Outcomes

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Learning Outcomes</th>
</tr>
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<tbody>
<tr>
<td>No Comment</td>
<td></td>
</tr>
<tr>
<td>Time-Anchored Comments</td>
<td>*</td>
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</table>

Perceived Engagement

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Perceived Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Comment</td>
<td></td>
</tr>
<tr>
<td>Time-Anchored Comments</td>
<td>*</td>
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</table>

* indicates a significant difference.
Design Implication #1

“Some users *noted* the important or *complex contents* of the courses, and I can *read* these notes after watching the course video.” *(S2)*
Design Implication #2

Social-oriented comments are desirable.

Comment number left by participants
Design Implication #2

”There are lots of interesting comments in the video. I’d like to read and respond to those comments when I feel something is boring in the courses.” (S15)
Conclusion

Dynamic display enhanced perceived social interactivity.

Display comments enhanced perceived engagement.
Conclusion

Dynamic display enhanced perceived social interactivity.

Display comments enhanced perceived engagement.
Acknowledgement

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Limitation

Lab Setting Experiment
Lack of Contextual Factors
Future Work

 Deployment Studies
 Actual Online learners