Re-Design and Evaluation of an Anchored Discussion System

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Presentation Outline

- Introduction
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  - Goal & Approach

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- Improved Anchored Discussion Systems
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  - Teacher-Based Attention Guidance Software
  - Peer-Oriented Attention Guidance Software

- Research Questions & Hypotheses
- Methodology
- Results
- Conclusion & Current Work

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Motivation

• What is anchored discussion?
  – An anchored discussion system displays learning material not only side by side with chronologically organized threaded discussion messages, but also provides a linking functionality between the two.

• Prior Research: (anchored vs. regular forum)
  – Study 1 Outcome: An anchored discussion system reduces the cognitive load involved in correctly interpreting messages.
  – Study 2 Outcomes: Three reported outcomes
    a) More individual interpretation of theoretical concepts
    b) Less personal experience oriented replies
    c) Stronger overall network connection

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Motivation

• Prior Research: (isolate two functional characteristics of anchored discussion
  – Study 3 Outcome: Proposed and evaluated a theoretical model based on the concept of common ground.
  – Study 4 Outcome: Linking functionality enhances individual learning outcomes from online social interaction.

• Problem Statement: Students have a tendency to lose focus and acquire “malprioritized concepts” when they participate in online social interaction
  – Reason 1: The possibility of annotating every detail in a complex learning material can distract student’s attention
  – Reason 2: Students with low domain specific prior knowledge require instructional support

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Goal:  
- Focus social construction of knowledge on relevant information from complex learning material.

Approach:  
- Re-design and evaluation of an anchored discussion system with respect to two instructional design perspectives.  
  a. Teacher scaffolded attention guidance strategy  
  b. Peer-oriented attention guidance strategy
Theoretical Underpinning

- Attention Guidance in Social Construction of Knowledge
  - The possibility of processing every detail including irrelevant information and seductive details can direct students’ attention away from central domain concepts, principles, and their interrelations.
  - Attention guiding cues can focus students’ attention on specific parts of complex learning material in order to support social construction of knowledge.
• Control Software:
  – Hovering over an annotated text lights up both the part of the text and associated discussion in red.
  – Student’s reason for making an annotation appear in a sticky message.
  – Drag and drop from text to message body.

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Teacher-Based Attention Guidance Software:

- Font size represents relative importance
- Default and big are two font sizes
- Teacher uses the importance bar to change font size
Improved Anchored Discussion Systems

- Peer-Oriented Attention Guidance Software:
  - Extends the importance bar functionality to the students
  - Students must compensate for the loss of the teacher’s attention guiding cues
  - There are now default, big, and bigger font sizes

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1. What are the effects of teacher-based attention guiding cues on social construction of knowledge in online social interactions?
   
   H1a: Teacher-based attention guiding cues will increase the number of student annotations on relevant information from academic texts.
   
   H1b: Teacher-based attention guiding cues will facilitate higher quality interaction patterns focusing on relevant information from academic texts.

2. Will students continue to carry out discussions on relevant information when they switch from a teacher-based attention guidance software environment to one which is peer-oriented?

   H2: Students will continue to carry out discussions on relevant information when they switch from a teacher-based to a peer-oriented attention guidance software environment.
Methodology

- **Pilot Study**: Determine which big font size captures student attention in an involuntary or obligatory fashion.
  - Participants: 8 doctoral students in a blended format research seminar.
  - Outcome: Students process the parts of a text with 150% larger font size first.

- **Main Study**: Longitudinal quasi-experimental design with control and treatment groups.
  - Participants: 24 doctoral students in two sections of a blended format learning and pedagogical theories seminar.
  - Control group did not have access to attention guidance cues.
  - Treatment group switched from teacher to peer-oriented attention guidance.

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## Selecting Relevant Information

<table>
<thead>
<tr>
<th>Condition</th>
<th>Discussion</th>
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<tr>
<td>Teacher-Based Attention Guidance Software Environment</td>
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<tr>
<td>Number of Annotations on Important Areas</td>
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<td>All Annotations per Discussion</td>
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<td>Control Software Environment</td>
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**Eryilmaz et al., (2012) CGU 12**
Results

Trends for Selecting Relevant Information

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### Results

**Discussing Relevant Information**

<table>
<thead>
<tr>
<th>Knowledge Category</th>
<th>Teacher-Based Attention Guidance Software Environment</th>
<th>Control Software Environment</th>
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<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Sharing</td>
<td>66</td>
<td>38</td>
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<tr>
<td>Questioning</td>
<td>52</td>
<td>30</td>
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<tr>
<td>Elaborating</td>
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<td>17</td>
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<tr>
<td>Negotiating</td>
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<td>13</td>
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<tr>
<td>Producing</td>
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<td>2</td>
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<tr>
<td>Total</td>
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Transitional State Diagram for Teacher-Based Attention Guidance Software Environment

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Transitional State Diagram for Control Software Environment

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Switching from Teacher-Based to Peer-Oriented Attention Guidance (Discussion 6)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage of Annotations on Important Areas</th>
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</thead>
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<td>Peer-Oriented Attention Guidance Software Environment</td>
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<td>Control Software Environment</td>
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## Content Analysis Results for Discussion 6

<table>
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<tr>
<th>Knowledge Category</th>
<th>Peer-Oriented Attention Guidance Software Environment</th>
<th>Control Software Environment</th>
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<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Sharing</td>
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<td>2</td>
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<tr>
<td>Total</td>
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• Teacher-based visual cueing is a viable way to direct novice students’ attention to central domain principles.
• Discussion building on teacher cued areas has higher quality interaction patterns.
• Treatment group students maintained their attention on teacher determined relevant information after switching to peer-oriented attention guidance software environment.

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Current Work

• Continue further design and evaluation of anchored discussion by using larger sample sizes from different populations.
• More fine-grained analysis of interaction patterns in anchored discussion

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Thank You for Your Time

Your Comments and Questions are welcomed. Please address feedback to:

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