Attention Guidance in Online Learning Conversations

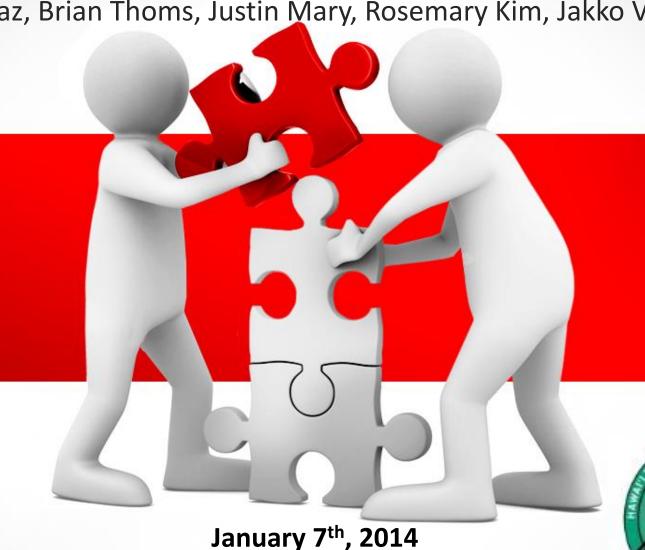Evren Eryilmaz, Brian Thoms, Justin Mary, Rosemary Kim, Jakko Van der Pol

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Overview

- Motivation and problem identification
- Objective of our solution
- Design and development
- Demonstration
- Evaluation
- Communication
- Comments & questions

Eryilmaz et al., (2014) BU-1

Motivation

- Collaborative learning is a popular educational strategy for preparing students to manage inter-professional expertise and collaborative construction of new knowledge in today's complex information systems projects.

- The open source annotation tool developed by Van der Pol et al. (2006) is an effective tool for facilitating common ground in online learning conversations.

Eryilmaz et al., (2014) BU-2

Motivation

Annotation tool's functional design:

➢ decreases coordination activities

➢ leaves more time and effort for two knowledge construction activities

➢ assertion and conflict activities favor greater gains in individual learning outcomes

Eryilmaz, E., Van der Pol, J., Ryan, T., Clark, M. P., & Mary, J. (2013). Enhancing Student Knowledge Acquisition from Online Learning Conversations. International Journal of Computer Supported Collaborative Learning, 8(1), 113-144.

Eryilmaz et al., (2014) BU-3

Problem Identification

Students gravitate to familiar (comfortable) topics and avoid challenging topics (Hewitt, 2005)

- Online discussions drift from one familiar topic to another, without diagnosing and resolving challenging misconceptions (Potter, 2008)

Eryilmaz et al., (2014) BU-4

Problem Demonstration

<u>Student 1:</u> *The paper's results reflect my own experiences. Information technology at my organization acts just in the ways described by the workers at the investigated organization. My colleagues and I act as knowledge brokers due to the nature of our jobs.*

<u>Student 2:</u> *I have also encountered the research problem in this paper in my own work when I consult with accountants, physicians, and attorneys.*

Eryilmaz et al., (2014) BU-5

Problem Demonstration

Student 1: *I do not have clear understanding of "process-product." Does it mean that if a prescribed procedure (a process) is followed, the result (product) will be the same? Is this a cookbook approach to student achievement?*

Student 2: *I am also having hard time with this. My take is that depending on the content, the students, and the context, as the instructor I choose what seems to be the best. For me, explicit instruction does fit at times. Inquiry and constructivist methods also find a place. It really depends on the learning goal...but I guess if I'm the one deciding then it really isn't constructivist at all, is it?*

Eryilmaz et al., (2014) BU-6

Objective of Our Solution

- Offer students an indirect way of focusing their attention on deep processing of challenging concepts

Objective of Our Solution

Student 1: *Can I consider cybernetic theory as an abstract version of technology threat avoidance theory (TTAT)? According to our weekly book reading, we can consider one concept to be more abstract over another concept when one concept is included within the meaning of another. In this case, the more general concept is considered more abstract. Since the authors used the cybernetic theory here as a framework to develop TTAT and the idea of the cybernetic theory is presented as a general idea for TTAT, I think it is ok to say that cybernetic theory is more abstract to TTAT.*

Objective of our Solution

<u>Student 2:</u> *According to your statement, I think it is reasonable to think that cybernetic theory is more abstract than TTAT.*

<u>Student 3:</u> *I do not quite agree because the authors used cybernetic theory here to support TTAT rather than abstract to TTAT. However, I might be wrong.*

<u>Student 4:</u> *I do not think so either. According to the authors, cybernetic theory is used as a framework to help explain their ideas. Based on my understanding, TTAT is a different concept and it is not a general version of cybernetic theory. Cybernetic theory seemed to me more like a tool that helped in describing the TTAT ideas.*

Eryilmaz et al., (2014) BU-9

Objective of Our Solution

Student 5: *I believe that cybernetic theory is not an abstract of TTAT. Cybernetic theory was the foundation to explain human behavior in order to show the loop conceptually and they extended the behavioral loop to support their TTAT.*
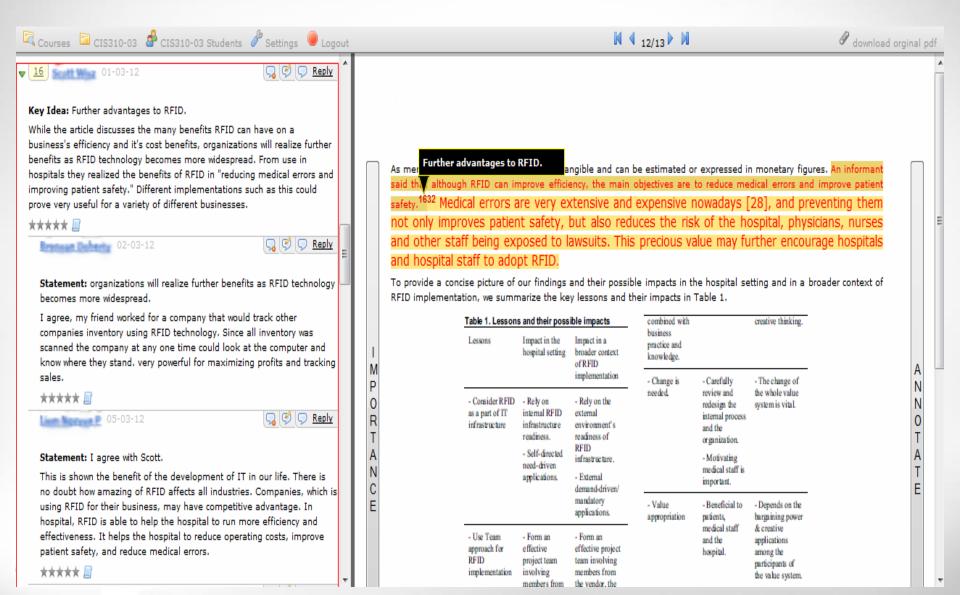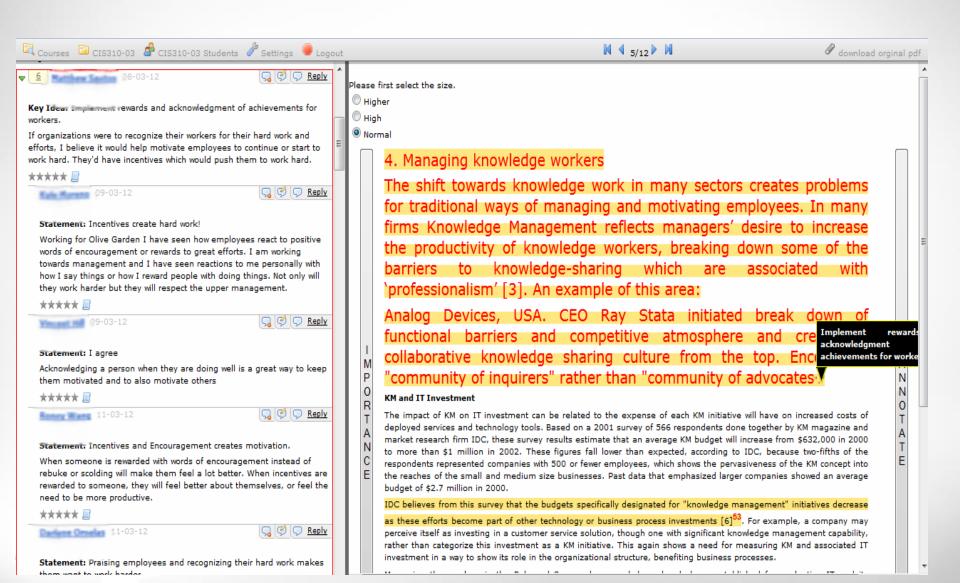
Student 1: *Ummm. Ok, I think I misunderstood.*

Design and Development

- Go beyond providing students annotated instructional materials (Wolfe, 2008)
- Font size is an effective visual property to capture attention in an involuntary and obligatory fashion (Lohmann et al., 2009)
  - **Faded instructor-based attention guidance functionality**
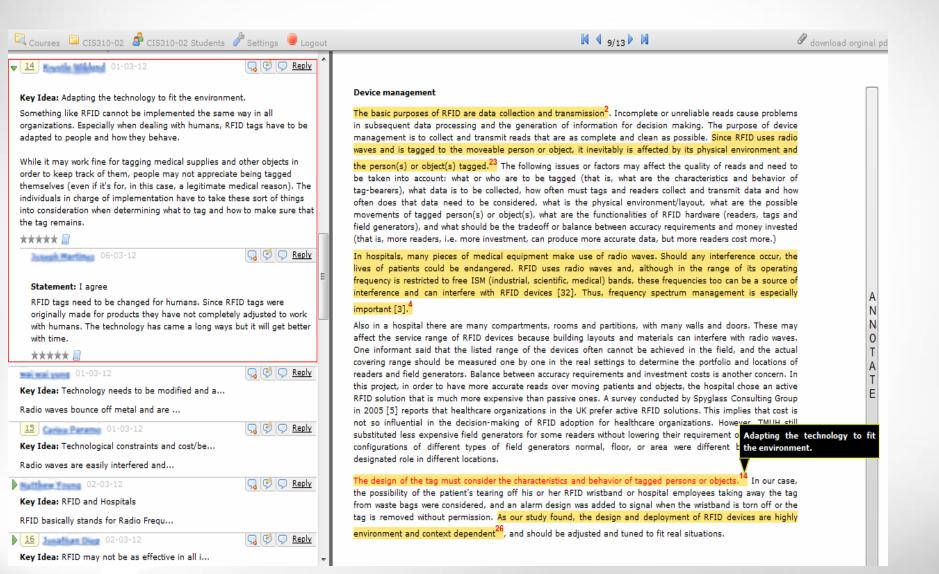 - **Peer-oriented attention guidance functionality**

Faded Instructor-Based Attention Guidance Functionality

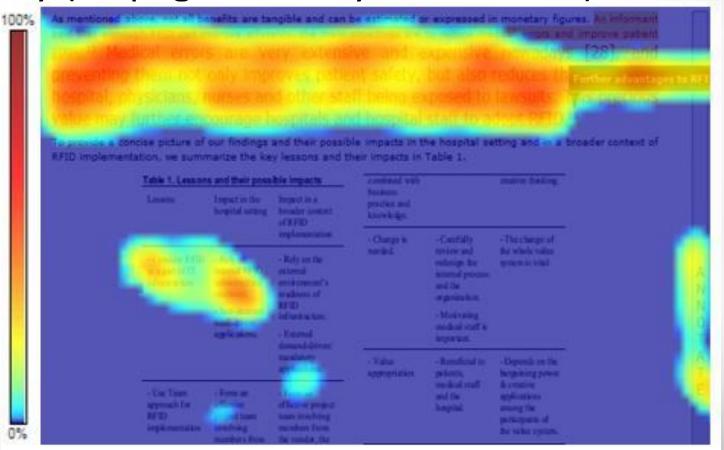# Peer-Oriented Attention Guidance Functionality

Control Software System

Demonstration

- Experimental study with 150 junior level business major students distributed to three sections of a blended-format management information systems course.

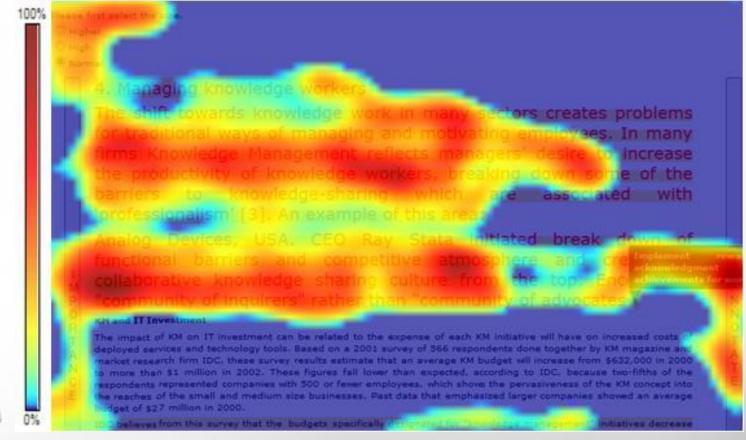- We randomly assigned each section to a software condition.

Eryilmaz et al., (2014) BU-15

Evaluation-Students' Attention Allocations

Faded-instructor based attention guidance functionality (32 page views by 32 students)

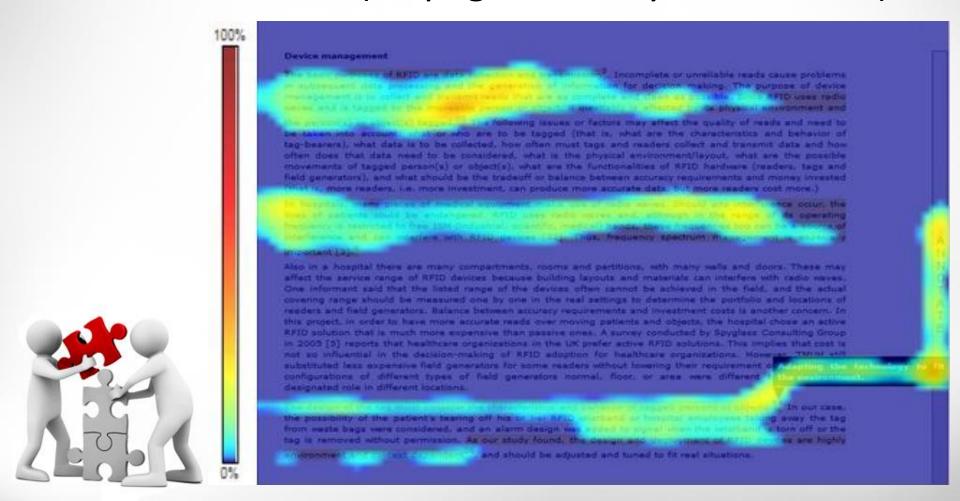# Evaluation-Students' Attention Allocations

Peer-oriented attention guidance functionality (34 page views by 34 students)

Evaluation-Students' Attention Allocations

Control software (27 page views by 27 students)

Evaluation-Interaction Patterns

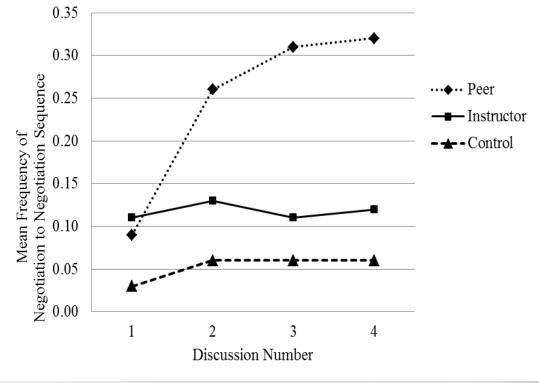|	Control Group		Peer-Oriented Attention Guidance Functionality Group		Faded Instructor-Based Attention Guidance Functionality Group		Test of Significance	
	%	f	%	f	%	f	χ^2	p
Sharing Information	52	370	38	294	34	278	57.13	<.001*
Exploring Dissonance	18	129	26	206	29	240	26.38	<.001*
Negotiating Meaning	19	136	30	236	30	243	29.80	<.001*
Testing Proposed Synthesis	7	51	4	34	5	41	6.29	0.043[n.s.]
Agreeing on New Knowledge	4	25	2	12	2	20	4.54	0.103[n.s.]
Total	100	711	100	782	100	822		

Evaluation-Interaction Patterns

Two-Event Sequences	Control Group		Peer-Oriented Attention Guidance Functionality Group		Faded Instructor-Based Attention Guidance Functionality Group		ANOVA			
	M (SD)	N	M (SD)	N	M (SD)	N	df	F	η²	p
Sharing Information → Exploring Dissonance	0.19 (0.47)	352	0.40 (0.7)	284	0.43 (0.74)	320	2, 29	13.99	0.03	<.001
Exploring Dissonance → Negotiating Meaning	0.96 (0.96)	125	1.35 (1.13)	167	1.61 (1.42)	158	2, 24	10.28	0.04	<.001
Exploring Dissonance → Sharing Information	0.94 (1.08)	125	0.46 (0.88)	167	0.42 (0.8)	158	2, 24	13.55	0.06	<.001
Negotiating Meaning→ Negotiating Meaning	0.05 (0.22)	136	0.26 (0.68)	326	0.01 (0.39)	290	2, 27	19.41	0.05	<.001

Mean frequency of negotiating meaning to negotiating meaning sequences as a function of group and time

Eryilmaz et al., (2014) BU-21

Communication

Low Prior Domain Knowledge (Controlled)

Attention Guidance Functions in Anchored Discussion — Instructor-based and peer-oriented attention guidance functions

High Task Complexity (Controlled)

Indirect way of focusing student attention on

Online Social Interaction

Shallow Processing of Text — Gravitating towards familiar topics by sharing existing experiences and opinions

Deeper Processing of Text — Diagnosing and revising challenging misconceptions by elaborating and negotiating ideas

Generate

Intellectual advances in areas where students struggle to understand

Eryilmaz, E., Chiu, M. M., Thoms, B., Mary, J., & Kim, R. (2014). Design and Evaluation of Instructor-Based and Peer-Oriented Attention Guidance Functionalities in an Open Source Anchored Discussion System", Computers & Education, 303-321.

Thank You for Your Time

Your Comments and Questions are welcomed.

Please address feedback to:

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Eryilmaz et al., (2014) BU-23