

# Community of Inquiry Framework and Learner Achievement

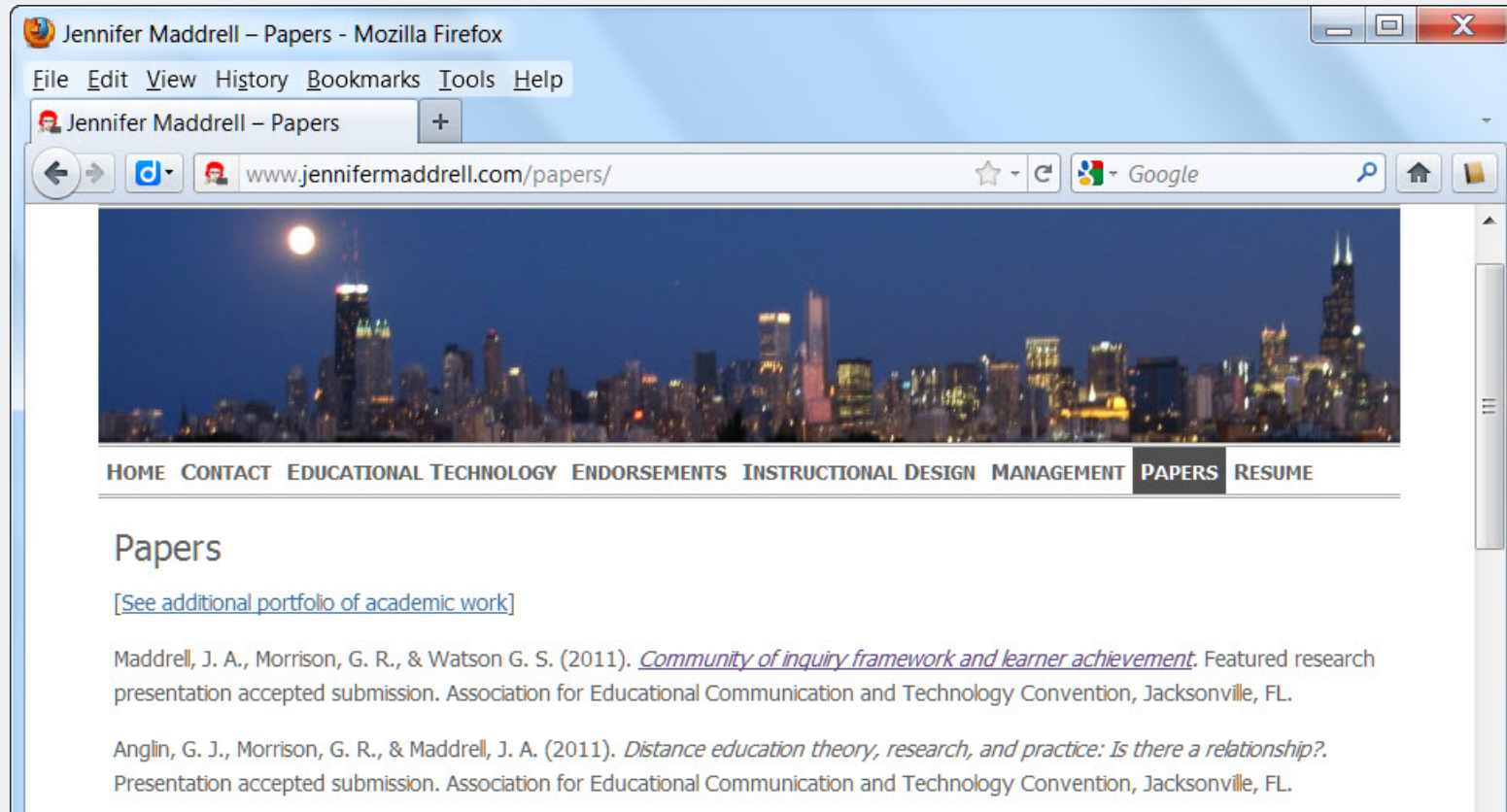


AECT Featured Research

Maddrell, Morrison, and Watson

11/11/11

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## Papers

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Maddrell, J. A., Morrison, G. R., & Watson G. S. (2011). *Community of inquiry framework and learner achievement*. Featured research presentation accepted submission. Association for Educational Communication and Technology Convention, Jacksonville, FL.

Anglin, G. J., Morrison, G. R., & Maddrell, J. A. (2011). *Distance education theory, research, and practice: Is there a relationship?*. Presentation accepted submission. Association for Educational Communication and Technology Convention, Jacksonville, FL.

# Purpose of this Research

To examine the extent to which students' perceptions of a community of inquiry are related to actual course learning achievement outcomes as assessed by the course instructor.

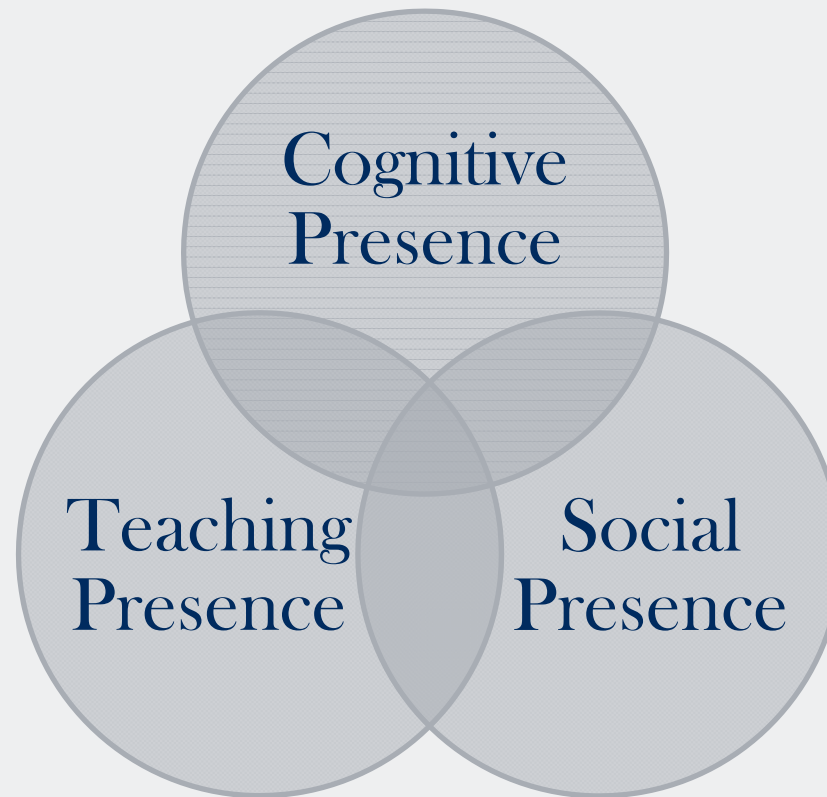
# CoI and Learning Outcomes

“The elements of a **community of inquiry** can enhance or inhibit the quality of the educational experience and **learning outcomes**.”

- Garrison, Anderson, and Archer (p. 92, 2000)

# Social-constructivist Framework

## Essential Elements of a CoI



# Rourke & Kanuka (2009)

Literature review of 252 CoI-based articles

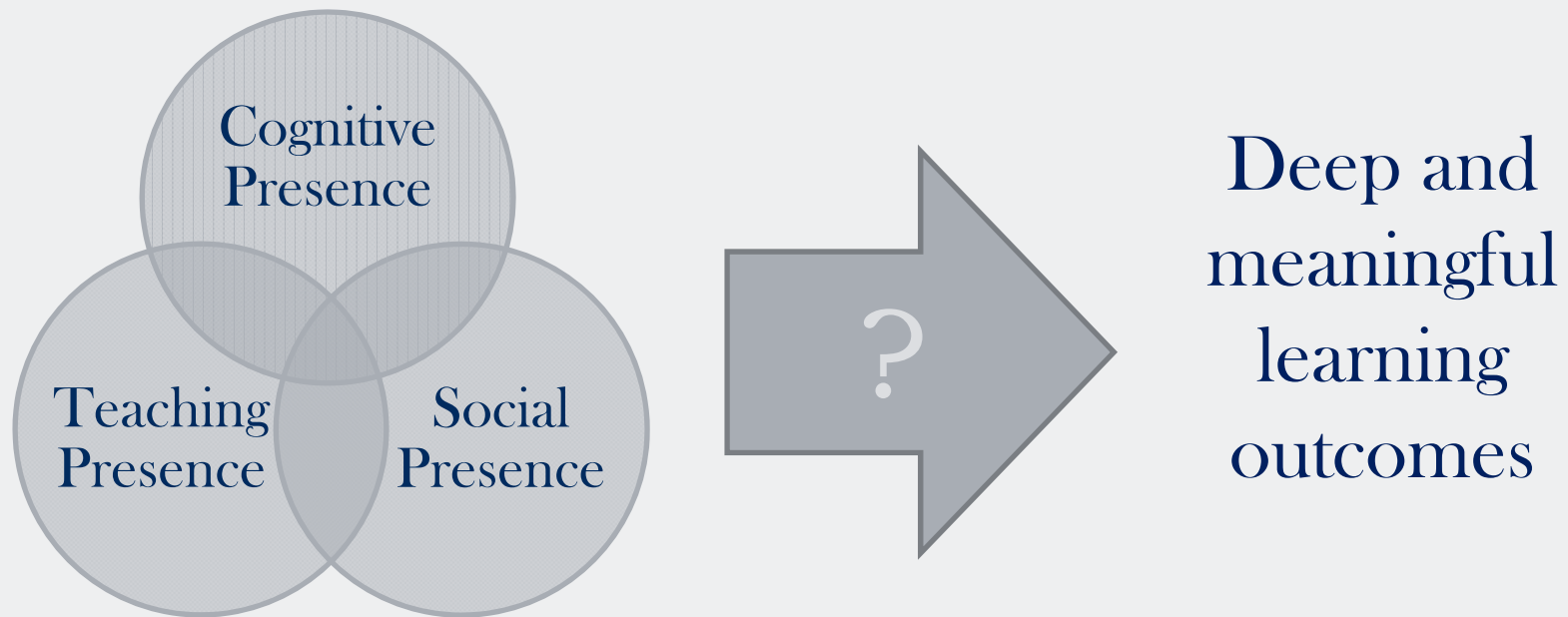
Preoccupation with measurement of:

- communication,
- interaction, or
- student perceptions

Lack of learning outcome assessment:

- Only 5 studies had measures of student learning
- All 5 studies were based on **perceived learning**

# Critique by Rourke & Kanuka (2009)



# Related Literature

## CoI in distance education literature

- Google Scholar: ~~1,050~~ 1,111 citations to 2000 article
- ProQuest database: “community of inquiry” in title or abstract of 60 studies

## CoI research

- Content analysis
- Student perception surveys
  - CoI presences
  - Perceived learning and satisfaction

## Beyond CoI research

- Interaction theory and research (LL - LT - LC)
- Whole class, group, and individual instruction

# Research Questions

1. To what extent are student perceptions of CoI related to objective measures of student achievement?
2. To what extent are student perceptions of learning related to objective measures of student achievement?
3. To what extent are student perceptions of learning and course satisfaction related to student perceptions of CoI?

# Participants

Five graduate-level courses in college of education

- Four instructional design theory and practice and one research methods
- Fifty-one consenting students (68% of enrolled)
- 96% were 26 or older and 57% were male

Geographically dispersed hybrid courses:

- 27% on the main campus
- 24% remote learning centers
- 49% other distance locations

# Synchronous & Asynchronous Activity

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Course	Live Sessions			LMS Access	
	<i>n</i>	Total Minutes	Audio-Video	Student ( <i>M</i> )	Teacher
1	7	927	Two-way	597	1,241
2	10	1,368	Two-way	594	931
3	13	1,693	One-way	617	1,882
4	11	1,172	Two-way	875	919
5	5	730	One-way	576	685
Total	10	1,215		663	1,152

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# Design

Non-experimental study

Correlation analysis

- Pearson bivariate correlation
- Stepwise multiple regression

Data collection

1. Instructor assessment of learning achievement
2. Survey of student perceptions
3. Other course data collection and observation

# Instructor-assessed Achievement

Significant project or paper in course

- Project score: Cumulative assigned / possible points
- SOLO score: 5-point scale Structure of Observed Learning Outcomes taxonomy (Biggs & Collis, 1982)

Final course assessment

- Course score: Cumulative assigned / possible points

# Student Perception Survey

## Student perceptions of CoI

- 37-items from CoI Survey (Shea & Bidjerano, 2009)
- 5-point Likert-type scale
- CoI composite and subscales from question groupings

Conducted twice (middle and end of semester)

## Other student data and perceptions

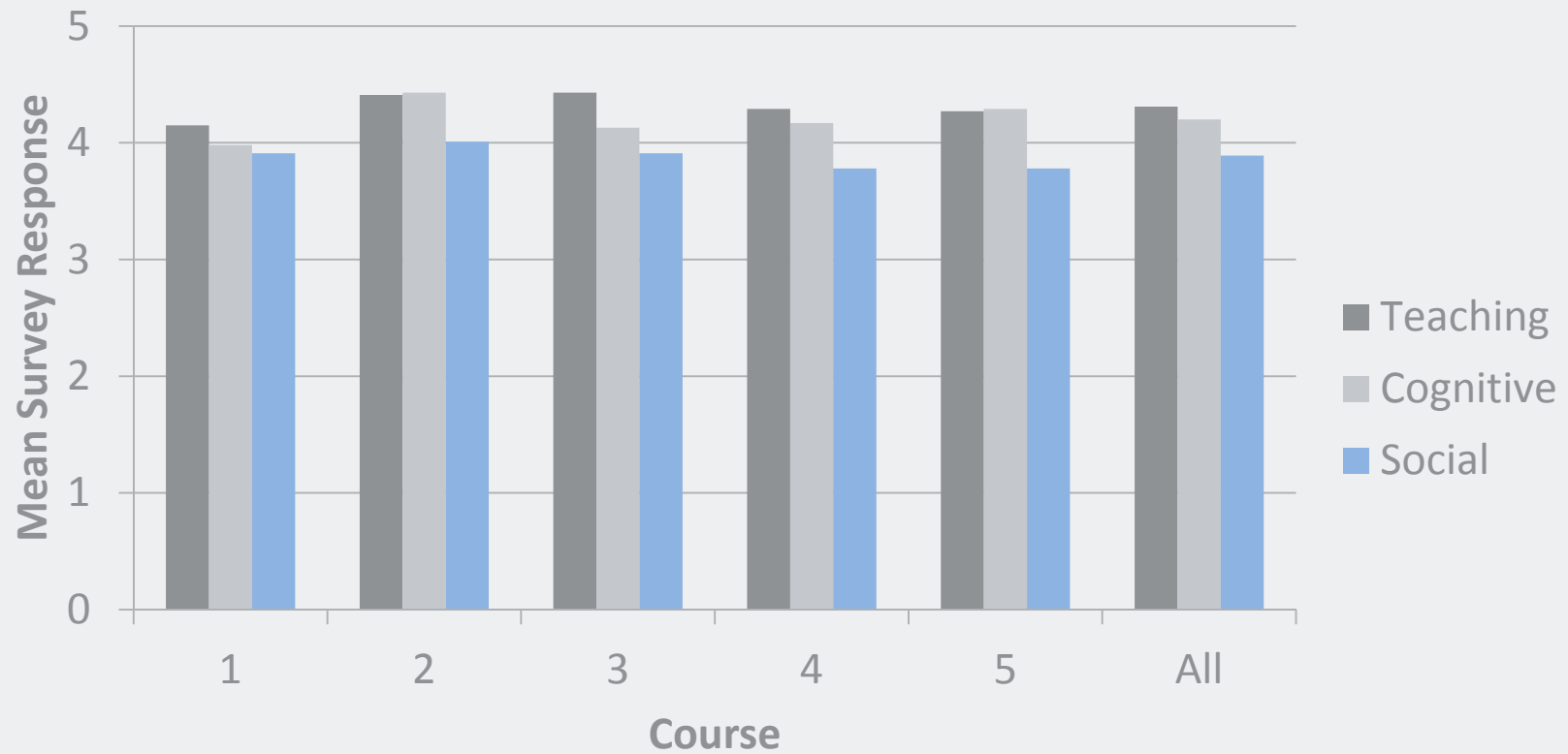
- Demographic data (age, gender, etc.)
- Perceived learning
- Course satisfaction

# communitiesofinquiry.com/methodology



# Mean Perceptions of CoI

Perceptions from Second Survey

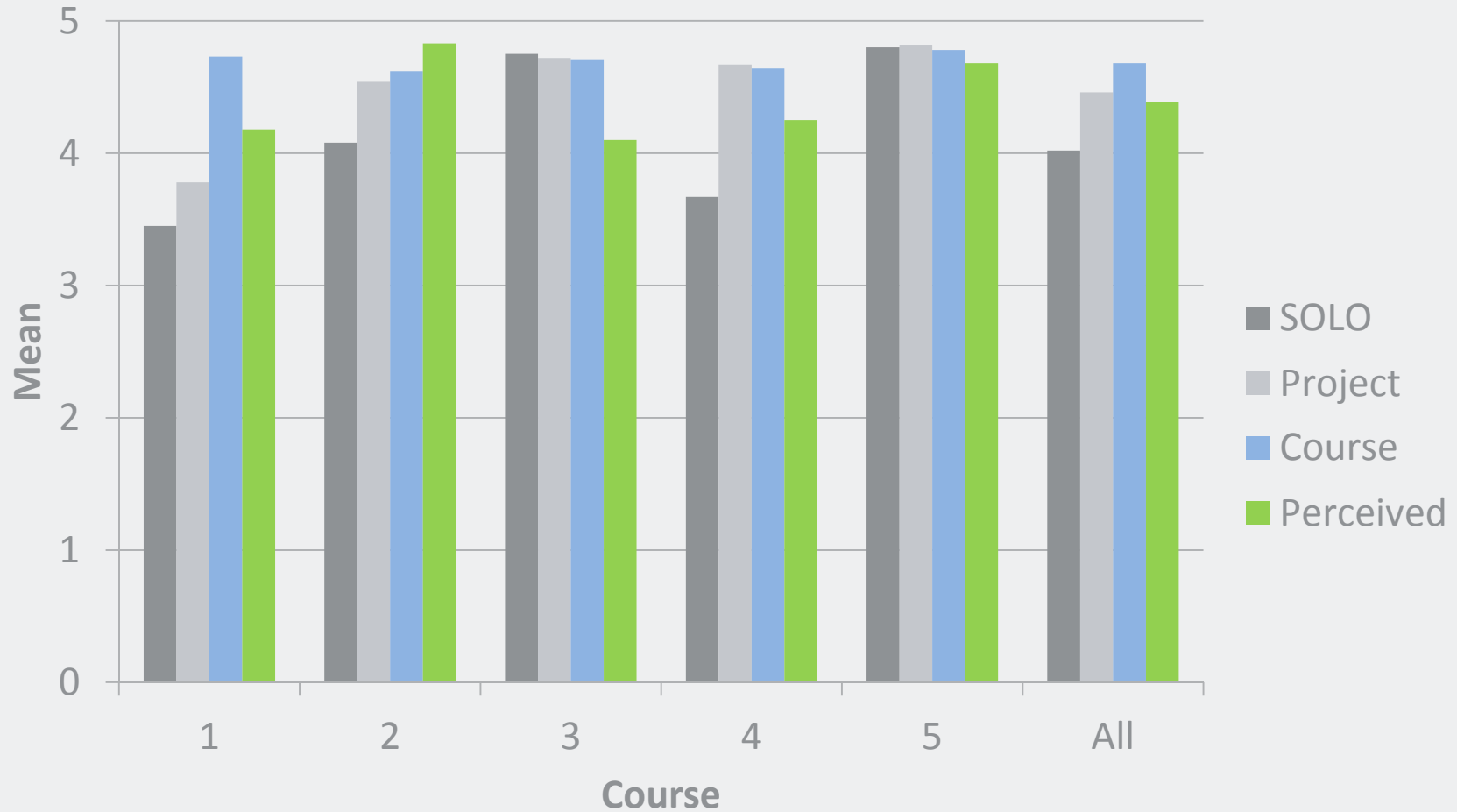


# Descriptive Statistics

## CoI measures:

- Statistically significant increase in perception of cognitive presence during the semester
- Social presence significantly smaller than both the cognitive presence and teaching subscales
- No significant difference between courses for the CoI composite or subscale measures
- Significant difference between place of attendance for social presence subscale

# Learning Outcome by Course



# Descriptive Statistics

## Learning outcome measures:

- Significant mean difference between courses for:
  - SOLO score: Course 1 < Course 3 and 5
  - Project score: Course 1 < All other courses
- Significant increase in student perceived learning over semester
- Instructor-assessed course score significantly larger than student perceived learning score

# Q1: CoI and Learning Achievement

## CoI and Instructor-assessed Learning Achievement Correlations

Measure	1	2	3	4	5	6
1. Teaching presence -						
2. Social presence	.52 <sup>***</sup>	-				
3. Cognitive presence	.74 <sup>***</sup>	.55 <sup>***</sup>	-			
4. CoI	.92 <sup>***</sup>	.76 <sup>***</sup>	.88 <sup>***</sup>	-		
5. SOLO score	.10	-.09	.09	.05	-	
6. Project score	.26	-.00	.29 <sup>*</sup>	.23	.76 <sup>**</sup>	-
7. Course score	.20	.05	.16	.17	.57 <sup>**</sup>	.43 <sup>**</sup>

\*  $p < .05$  level, two-tailed. \*\*  $p < .01$  level, two-tailed. \*\*\*  $p < .001$  level, two-tailed.

# Q2: Objective & Perceived Learning

## Achievement Measures and Student Perceived Learning Correlations

Measure	1	2	3
1. SOLO	-		
2. Project	.76*	-	
3. Course	.57*	.43*	-
4. Student perceived learning	-.04	-.07	-.04

\*  $p < .01$  level, two-tailed.

# Q3: Perceived Learning & Satisfaction

## CoI, Satisfaction, and Perceived Learning Correlations

Measure	1	2	3	4	5
1. Teaching presence	-				
2. Social presence	.52**	-			
3. Cognitive presence	.74**	.55**	-		
4. CoI	.92**	.76**	.88**	-	
5. Satisfaction	.57**	.38**	.54**	.59**	-
6. Perceived learning	.58**	.30*	.71**	.63**	.76**

\*  $p < .05$  level, two-tailed. \*\*  $p < .001$  level, two-tailed.

# The Big A-ha

- No relationship suggested between the CoI composite score and any of the three instructor-assessed learning achievement measures.
- No relationship suggested between any of the instructor-assessed learning achievement measures and student perceived learning.
- Student perceived learning, satisfaction, and CoI were significantly positively correlated.

# Implications

Outcome measures influence interpretation:

- Student self-reports of learning and the CoI survey-based measures are best used as approximations of **student attitude** toward the course, but not of objective measures of student learning achievement.
- Challenges studies that have relied on self-reports.
- Supports findings that self-reports not a substitute for objective measures of achievement.

# Implications

## Insufficient guidance to instructors:

- As a social-constructivist framework, the CoI “describes a generic educational experience” (Akyol et al., 2009, p. 124).
- As others have suggested, constructivism offers a philosophical framework, but has yet to evolve into a refined theory that describes effective instruction or design strategies (Tobias & Duffy, 2009).

# Implications

Direction needed regarding design of interaction:

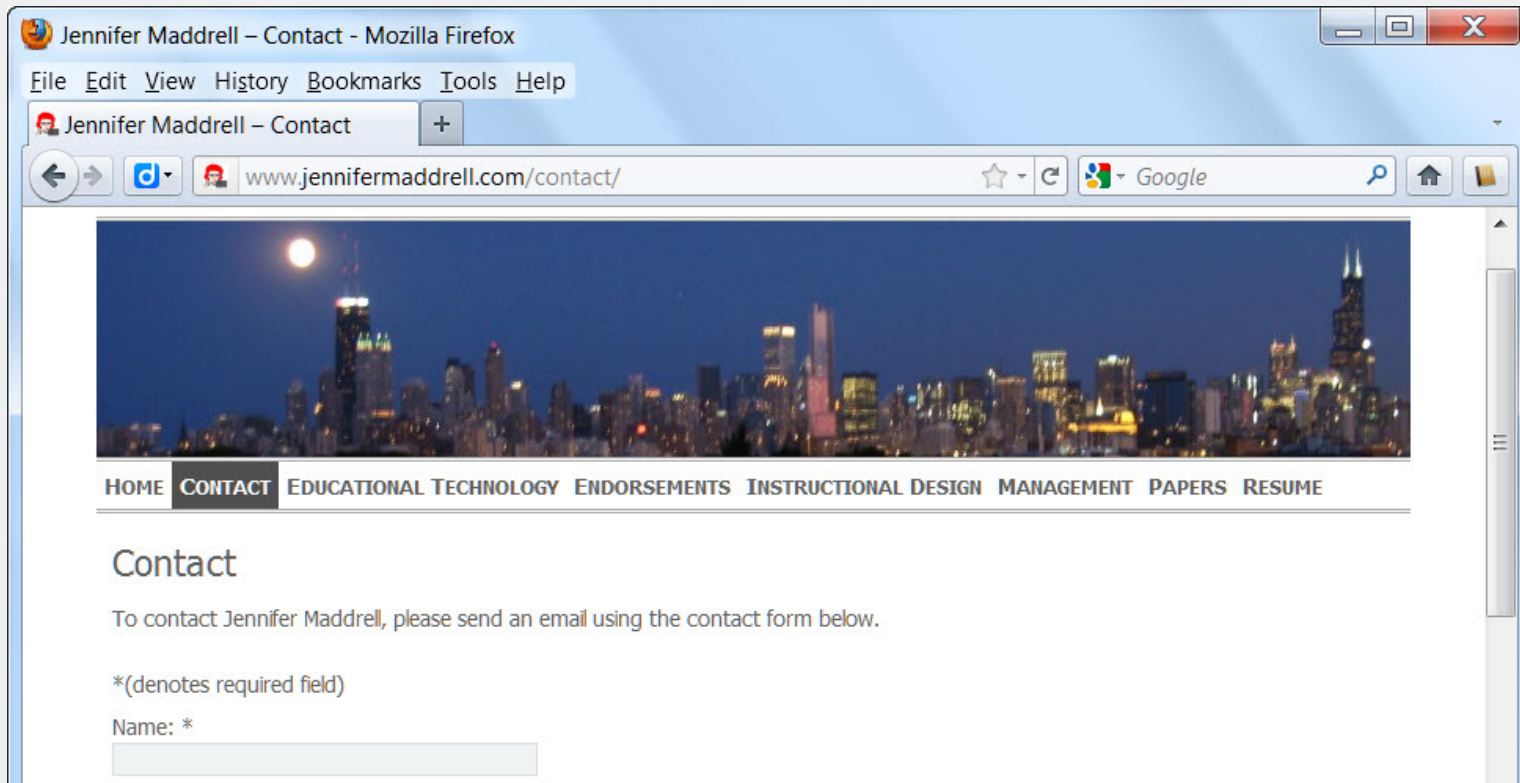
- What is the optimal design of LL - LT - LC interactions?
- Social presence predicted less than 5% of the variance in perceived learning and was not a predictor of instructor-assessed learning achievement or satisfaction.
- Findings support those who suggest research has not offered sufficient evidence of the instructional value of social interaction (Annand, 2011; Mayer, 2009).

# Conclusion

In support the Rourke & Kanuka (2009) critique:

- Research to date has yet to offer evidence that a CoI is related to enhanced learning outcomes.
- With no relationship suggested between the CoI framework and objective measures of learning, the value of the CoI as an educational process model remains challenged.

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# Research Questions

1. To what extent are student perceptions of CoI related to objective measures of student achievement?
2. To what extent are student perceptions of learning related to objective measures of student achievement?
3. To what extent are student perceptions of learning and course satisfaction related to student perceptions of CoI?
4. To what extent are student characteristics, course engagement features, and student course perceptions related to objective measures of student achievement, student perceptions of learning, and student perceptions of CoI?
5. To what extent do designed course interactions contribute to student perceptions of achievement?

# Q4: Student Characteristics, Course Engagement, and Course Perception

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Student Characteristics	Course Engagement	Course Perceptions
Age	Enrolled course	Difficulty
Gender	Live session location	Workload
Prior distance-learning	Live session minutes	Effort
Computer expertise	Student LMS access	Satisfaction
Live conferencing proficiency	Instructor LMS access	

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Variable	Predictor(s)	$R^2_{adj}$
SOLO score	Perceived workload	.10
Project score	Step 1: Enrolled course	.30
	Step 2: Live session minutes	.40
Course score	Step 1: Prior distance-learning (-)	.10
	Step 2: Student LMS activity	.20
Perceived learning	Step 1: Satisfaction	.58
	Step 2: Cognitive presence	.70
	Step 3: Social presence (-)	.72
CoI	Satisfaction	.34
Social presence	Step 1: Cognitive presence	.29
	Step 2: Prior distance-learning	.33
	Step 3: Live session location *	.39
Cognitive presence	Step 1: Teaching presence	.54
	Step 2: Social presence	.57
	Step 3: Instructor LMS (-)	.60
Teaching presence	Step 1: Cognitive presence	.54
	Step 2: Computer expertise (-)	.58
	Step 3: Satisfaction	.61

# Q5: Perceived Contribution of Class Interactions to Learning

## Achievement Measures and Student Perceived Learning Correlations

Measure	1	2	3	4	5
1. Live Session	-				
2. Readings	.55**	-			
3. Teacher One-on-One	.65**	.47**	-		
4. Projects or Papers	.37**	.65**	.44**	-	
5. Online discussions	.36*	.35*	.48**	.35*	-
6. Student perceived learning	.59**	.54**	.48**	.49**	.29*

\*  $p < .05$  level, two-tailed. \*\*  $p < .01$ , two tailed.

## Q5: Results

No significant difference over semester or courses

Stepwise multiple regression analysis:

- 40% of the variance in student perceived learning was explained by students' perceptions of the learning contribution of (a) live sessions, and (b) papers and projects.
- Yes ... class sessions and homework were predictors of perceived learning. Go figure!