Examining the Impact of Online Case-Based Discussions on Students' Cognitive Presence, Perceived Learning and Satisfaction

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Background

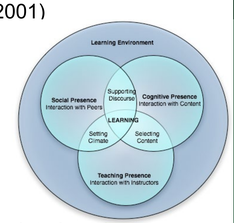
- With the recent rapid growth of online education, identifying "best practices" to facilitating student learning in online environments has gained considerable interest.
- In the search for maximizing the quality of online learning, instructors seek strategies that foster higher level learning.
- High-level learning occurs when instructors use effective strategies that require cognitive collaboration of learners resulting in integration, synthesis, and evaluation of ideas (Garrison, 2016) .
- Case-based discussion (CBD) is one of the strategies used in online courses to develop high-level learning through application of real-world scenarios (Ertmer & Koehler, 2018; Sadaf & Kim, 2019).
- Case-Based Discussions consist of decision-making problems referred by Jonassen (2010) as a rational choice model.
  - Cases describe a scenario in which a specific course concept is applied to solve the issue.
  - Students analyze the problem situations, reflect on the concepts learned in the course and propose solutions to the issues presented in the case.

Research Questions

1. What is the difference in students' perceived learning outcomes (cognitive presence, learning, and satisfaction) between CB and NCB online discussions?
2. What is the difference in the phases of cognitive presence (triggering, exploration, integration, and resolution) between CB and NCB online discussions?
3. What is the difference in relationship between students' perceived learning outcomes (cognitive presence, perceived learning, satisfaction) and academic outcomes (discussion grade and final course grade) among online CB and NCB discussions?

Theoretical Framework

Community of Inquiry (Garrison et al., 2001)



- **Social presence** reflects the interpersonal relationships in the community through peer interaction
- **Teaching presence** provides leadership throughout the course through instructor interaction
- **Cognitive presence** provides a support of social constructivist approach to learning through course content interaction

Cognitive presence is defined as the "extent to which learners are able to construct meaning through sustained communication - reflection and discourse in the critical community of inquiry."

Cognitive presence can be measured by the Practical Inquiry Model (PIM) that involves four key phases of the cognitive process:

Phases	Categories	Descriptions
(1)	Triggering	Become aware of a problem by asking questions
(2)	Exploration	Explore a problem by searching or offering information
(3)	Integration	Integrate interpretations and construction of possible solution
(4)	Resolution	Resolve the problem by critical evaluation of the solution

Methods

Participants

- 80 (75%, n = 60, male; 25%, n = 20, female) graduate students enrolled in a 15-week long online Instructional Design course.

Procedure

- Week-long discussions during the semester (n=13)
  - Case-based discussions (n=3)
  - Non-cased based discussions (n=10)

Data Collection

- The CoI survey including 12 items from the CoI survey that measure cognitive presence.
- Course and Discussion grades

Data Analysis

- Descriptive statistics using means and standard deviations
- Paired t-test was be performed for each variable separately to examine the difference between case-based and non-case-based discussions

Results

Difference in perceived cognitive presence, learning and satisfaction

Table 1. Students' phases of perceived cognitive presence, satisfaction, and learning in CB and NCB discussions (n = 80).

	CB discussions		NCB discussions		
Phases of cognitive presence	Mean	*SD*	Mean	*SD*	Significance
Triggering	4.17	0.62	3.92	0.72	p = .001**
Exploration	4.13	0.66	4.04	0.69	p = .063
Integration	4.19	0.71	4.07	0.74	p = .034
Resolution	4.29	0.67	4.10	0.73	p = .001**
Satisfaction	4.21	0.74	3.95	0.86	p = .001**
Perceived Learning	4.15	0.80	3.96	0.91	p = .018

Note. ** Paired *t*-test is significant at the 0.01 level (two-tailed).
* Paired *t*-test is significant at the 0.05 level (two-tailed).

Difference in the phases of cognitive presence

Table 2. Students' perception of the difference in subcategories within phases of cognitive presence between CB and NCB discussions (n = 80).

	CB discussions Mean	NCB discussions Mean	Significance
Triggering Event			
Problems posed in discussions increased my interest	4.38	3.98	p = .001*
Discussions piqued my curiosity	3.95	3.81	p = .101
I felt motivated to explore content	4.18	3.96	p = .021
Exploration			
I utilized information sources to explore problems	4.05	3.98	p = .358
Brainstorming & finding information helped me solve problems	4.20	4.05	p = .028
Discussions helped me appreciate different perspective	4.15	4.09	p = .401
Integration			
Combining information helped me answer questions	4.15	4.10	p = .496
Learning activities helped me construct explanations and solutions	4.25	4.06	p = .008
Reflection on course content and discussions helped me understand concepts	4.16	4.06	p = .219
Resolution			
I can describe ways to test and apply knowledge	4.25	4.08	p = .015
I have developed solutions of practical problems	4.33	4.10	p = .007
I can apply knowledge to my work	4.30	4.14	p = .004*

Note. * Paired *t*-test is significant at the 0.05 level (two-tailed).

Difference in Relationship

Table 3.
Pearson correlation coefficients between perceived cognitive presence, perceived satisfaction, perceived learning, discussion grades, and course grade (n=44)

	Exploration (CB)	Integration (CB)	Resolution (CB)	Exploration (NCB)	Integration (NCB)	Perceived satisfaction	Perceived learning	Discussion grade (CB)	Discussion grade (NCB)
Integration (CB)	.319								
Resolution (CB)	.038	.402							
Exploration (NCB)	.186	.323	.125						
Integration (NCB)	.195	.388	.142	.130					
Perceived satisfaction	.244	.268	.036	.252	.053				
Perceived Learning	.235	.186	.009	.271	.095	.826			
Discussion grade (CB)	.395	.637	.367	.421	.239	.232	.205		
Discussion grade (NCB)	.283	.399	.144	.497	.506	.128	.080	.437	
Final grade	.454	.526	.195	.468	.367	.246	.219	.685	.642

Note. CB represents case-base-discussion and NCB indicates non-case-based discussion.

Conclusions

- Case-based discussions can stimulate students' high-level thinking by engaging them in constructive discourse related to both case and content of the course.
- Student can reach high levels of cognitive presence, progressing from triggering to integration and resolution phases, when instructors require students to provide a solution to cases that lead discussion to a meaningful resolution of ideas.
- Students are more satisfied and perceive to achieve high levels of cognitive presence using case-based discussions.
- Case-based discussions that ask students to explore the problems, find and justify their solutions to facilitate high-levels of cognitive presence can lead to deeper constructivist learning among students.

Implications

To enhance cognitive presence and learning outcomes in online discussions:

- Give students an authentic task such as a case or a problem to solve that can make discussions relevant to their learning.
- Explicitly ask students to provide rationale for their solutions so they can critically think about their learning and step back to examine their own solutions.
- Provide well structured discussions that frame the entire activity to guide the process of student discourse and interaction.

Publication

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