

Coding Analysis Tool for Asynchronous Online Classroom Discussion

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Abstract

This project developed a coding tool for characterization of online, asynchronous classroom discussion. The tool is designed to be efficiently and reliably employed by researchers to analyze discussion. Consistent application will also facilitate comparison and meta-analysis of studies. Such analysis and comparison supports refinement of educational best-practices in this medium.

Problem

Researchers commonly utilize differing coding based analysis schemes to characterize and assess asynchronous online classroom discussion. Without common elements and definitions, it is difficult to compare and synthesize results from these independent studies. Although each study will require some specialized definitions to support research interests, it would be valuable if each also employed some shared definitions to support comparison and synthesis.

Purpose

Develop a coding-based tool for characterization of online, asynchronous classroom discussions that is:

- Grounded in the Community of Inquiry theoretical model
- Applicable to multiple types of classroom discussions
- Encompasses the range of items of interest to researchers
- Reliably applicable by researchers
- Efficient enough to be employed as a standard coding set when conducting content analysis research

Relevant Literature

The community of inquiry model developed by Garrison, Anderson, and Archer (2000) provides a description of communications in an online classroom which is consistent with constructivist learning theory, activity theory, group development theory, and Dewey's (1910) phases of cognitive development. Cognitive presence, social presence, and teaching presence together define the overall educational experience. This model is widely employed in online discussion research.

Research Questions

Stage 1: Synthesize Definitions

What coding frameworks are currently employed in analysis of online, asynchronous discussion? What are common elements of these frameworks? Can they be synthesized into a single set of definitions?

Stage 2: Valid Representation

Do coding definitions occur in discussion with sufficient frequency for meaningful analysis?

Stage 3: Reliable Definitions

Are coding definitions reliable when employed by different coders?

Stage 4: Useful Definitions

What are the most meaningful coding definitions? Which definitions overlap? Which definitions best describe the overall value of the discussion post?

Procedures and Analysis

Stage 1: Synthesize Definitions (to 108 codes)

Employed a systematic literature review of coding based discussion analysis conducted between 2002-2010. This identified:

- 172 research or meta-analysis papers
- 120 primary authors
- 54 different coding schemes

Definitions from all 54 coding schemes were grouped and synthesized to a single, comprehensive set of definitions utilizing the community of inquiry model:

Stage 2: Valid Representation (to 79 codes)

Coding definitions applied to 233 posts to estimate representation. Culled if not in 10%-90% range.

Stage 3: Reliable Definitions (to 53 codes)

Cohen kappa threshold of 0.30 utilized in two rounds of coding (357 posts and 369 posts). Four coders with all pairings assessed.

Stage 4: Useful Definitions (to 31 codes)

Two coders analyzed 1399 discussion posts with a 250 post reliability sample. Discussions from freshman and senior courses at fully online university included support forum, group discussion, structured debate, product critique, and prompted topic discussions. Analysis included definition correlation analysis, *t*-test analysis of definition impact on perceived value, coding frequency, and reliability.

Findings

Portrayal of Self (social presence)

- Writing Errors (Boolean, 0.77)
- Poor Organization (Boolean, 0.73)
- High Writing Quality (Boolean, >0.30)
- Structure of Ideas (Ordinal, unknown)

Relations with Others (social-teaching)

- Agreement (Ordinal-3, 0.32)
- Supports Others (Boolean, >0.17)
- Direct Acknowledgement (Boolean, 0.72)

Content Contribution (teaching presence)

- Argument (Boolean, 0.41)
- Narrative (Boolean, unknown)
- Product (Boolean, unknown)
- Quality of Support (Ordinal-3, 0.43)
- Evidence from Colleagues (Boolean, >0.10)
- Academic Evidence (Boolean, >0.45)
- Experience as Evidence (Boolean, >0.49)

Facilitating Learning (teaching-cognitive)

- Reflection (Boolean, unknown)
- Elicit Thinking (Boolean, unknown)
- Supports Improvement (Boolean, unknown)

Structure of Thinking – Bloom's (cognitive)

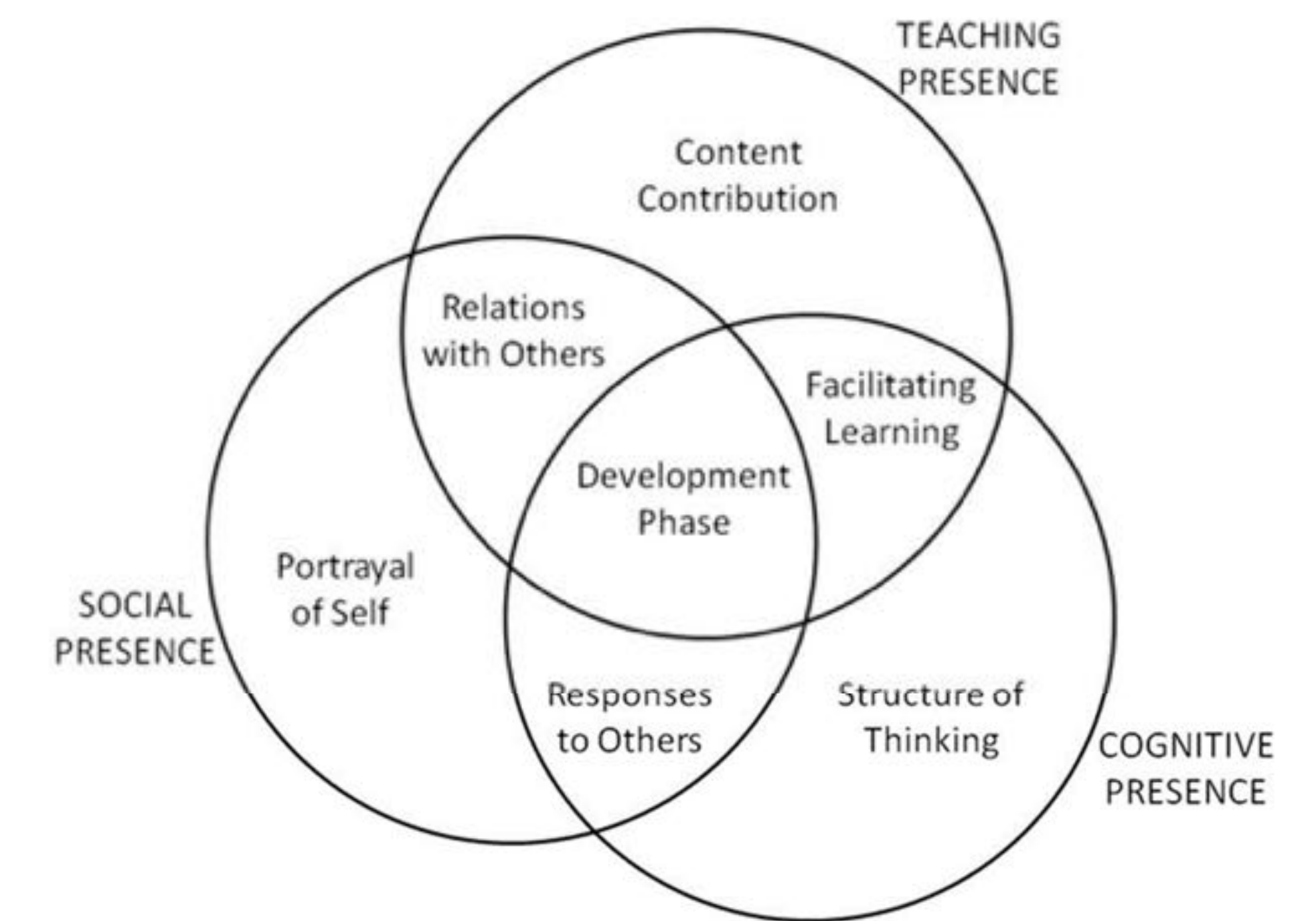
- Knowledge/Remembering (Boolean, 0.02)
- Comprehension/Understanding (Boolean, 0.09)
- Application (Boolean, 0.01)
- Analysis (Boolean, 0.16)
- Synthesis/Creating (Boolean, 0.07)
- Evaluation (Boolean, 0.04)

Responses to Others (cognitive-social)

- Question (Boolean, 0.76)
- Critical Response (Boolean, >0.25)
- Extends Ideas (Boolean, unknown)

Development Phase (overall)

- Initiation/Clarification (Boolean, 0.23)
- Exploration (Boolean, 0.22)
- Judgment (Boolean, 0.06)
- Resolution (Boolean, unknown)



Limitations

Limitations are imposed by the nature of the medium studied, by the sample of discussions chosen for analysis, and by study limitations for further assessing and revising the framework.

- Only applied to threaded, asynchronous discussion forums not all classroom forums.
- Only applied to undergraduate general education classrooms.
- Only applied in a fully-online environment, not hybrid.
- Not all definitions achieved desired reliability level of Cohen kappa > 0.30.

Conclusions

This study developed a coding analysis tool for asynchronous, online classroom discussion that is grounded in the Community of Inquiry model, applicable to multiple discussion types, comprehensive, reliable, and efficient.

Social Change Implications

Online classroom discussion is ubiquitous in higher education today, with both online and hybrid courses. This tool supports analysis of discussion and refinement of best educational practices in this medium. The adoption of this coding scheme by current research efforts will allow results from all studies employing the scheme to be easily compared, speeding the identification of best practices to improve learning for the millions of learners engaged in learning through asynchronous discussion.

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