Investigating Students' Interactions in Online Written Assignments

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Introduction

The COVID pandemic brought on a worldwide increase in the use of online teaching, but relatively little research on mechanisms to encourage and assess active learning methods in virtual settings. We have created a tool to understand and digest virtual collaboration for students. Using this forum, we analyzed student engagement, collaboration and improved performance.

Materials and Methods:

Participants:

The participants for this study include social sciences undergraduate students enrolled in an introductory statistics course.
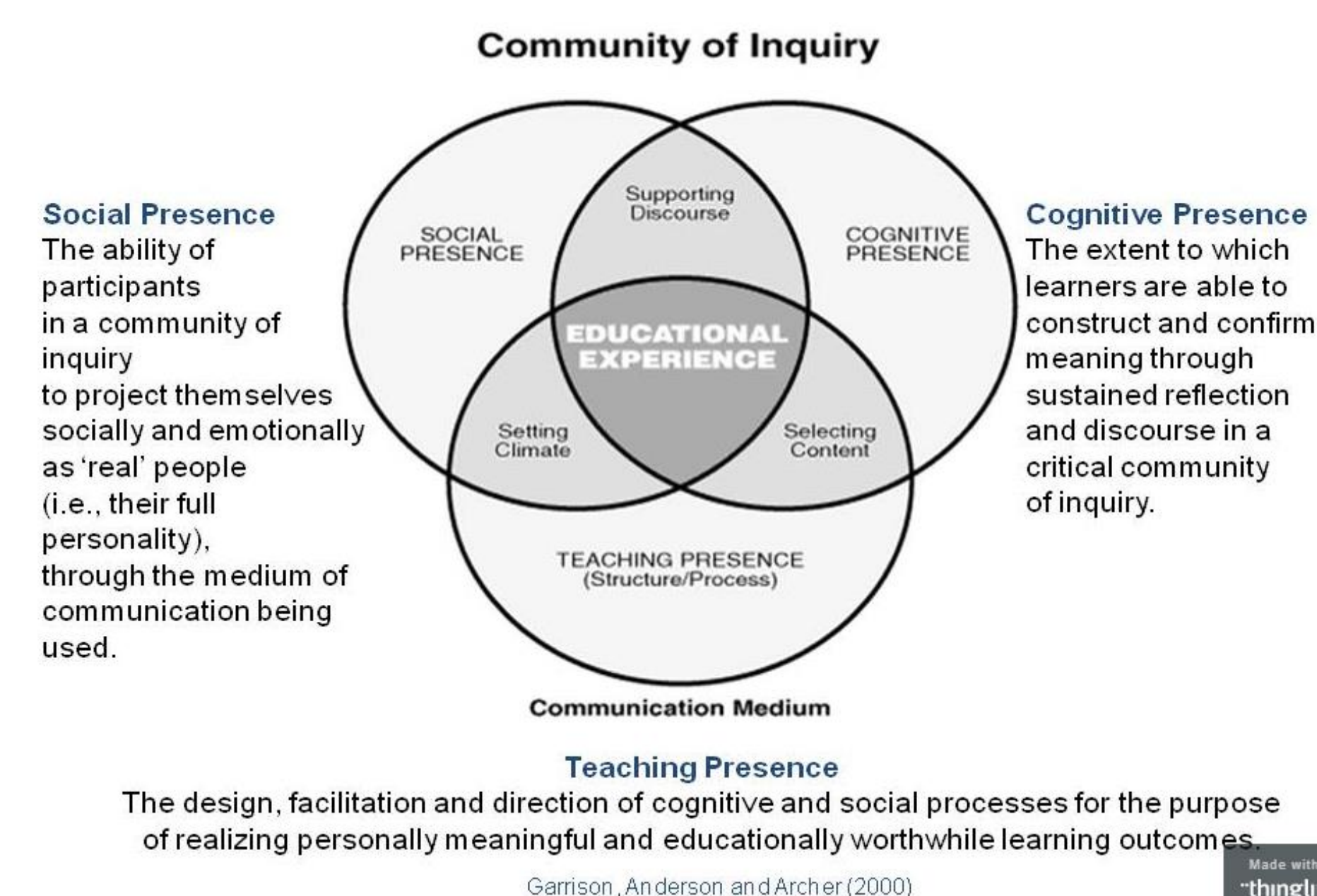
Collaborative Keys:

Collaborative Keys consist of initial answers, discussion, and final answers as a team. The framework we are using for assessment includes a social, teaching, and cognitive aspect.

Rubrics:

We were able to create a rubric to grade the initial and final answers for each collaborative key. We graded each student's answers separately first, and then after completing our grading for a collaborative key, we would then compare our grades. If we disagreed on a particular grade, we would discuss and agree upon a final grade. This process was repeated for all initial and final answers for all students and all collaborative keys.

Framework:

We used the Community of Inquiry Framework to categorize cognitive and teaching presence.

Community of Inquiry

Social Presence
The ability of participants in a community of inquiry to project themselves socially and emotionally as 'real' people (i.e., their full personality), through the medium of communication being used.

Cognitive Presence
The extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry.

Teaching Presence
The design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes

Garrison, Anderson and Archer (2000)

Research Questions:

1. How do groups and group members behave and interact with each other when using the CKs?
2. How do these dynamics relate to and affect performance? How do groups differ in their interactions and how is this related to measures such as performance, attitudes, and retention?
3. How do the interactions change over time?

Example Rubric: INITIAL + FINAL ANSWERS

18. According to this convention, is the sample size large enough in this study to use the normal approximation and theory-based inference? Justify your answer.

1:
- No answer provided

Example (1):

2:
- Not a blank answer but answer does not include any of the content
- No attempt to answer the question

Example (2):
  I don't know

3:
- Answer "no"
- Answer "yes" but without justifying their answer

Example (3):
  Yes

4:
- Answer "yes" but their justification is incorrect
- Fail to identify that there are 63 (> 10) students chose Tim on the left
- Fail to identify that there are 15 (> 10) students chose Tim on the right.
  OR
- Fail to identify what "success" and "failure" are in context

Example (4):
  Yes! I believe this is more than enough attempts to satisfy the requirement of at least 10 successes and 10 failures.

5:
- Answer "yes"
- Identify that there are 63 (> 10) students chose Tim on the left
- Identify that there are 15 (> 10) students chose Tim on the right.
- Identify success and failure in context

Example (5):
  (a) Yes, the sample size condition is met. There are 63 (> 10) students chose Tim on the left and 15 (> 10) students chose Tim on the right.
  (b) Yes, because there were over 10 students who chose Tim for the left as well as over 10 students who did not choose Tim for the left

Grading Initial Answers

1: Blank/no answer

2: "I don't know" type answer

3: Completely Wrong answer

4: Partially Correct (but not perfect)

5: Correct

Grading Process for Initial Answers

We graded each student's initial answer for each collaborative key separately, and then after completing the grading of all students' initial answers for a collaborative key, we would input our results into a spreadsheet as shown below, and if we disagreed on a grade, we would discuss and reach a final agreed upon answer for every student's initial answer and repeat this process for all collaborative keys. Below is an example of what one of our spreadsheet's for one collaborative key looks like, each row represents a student.
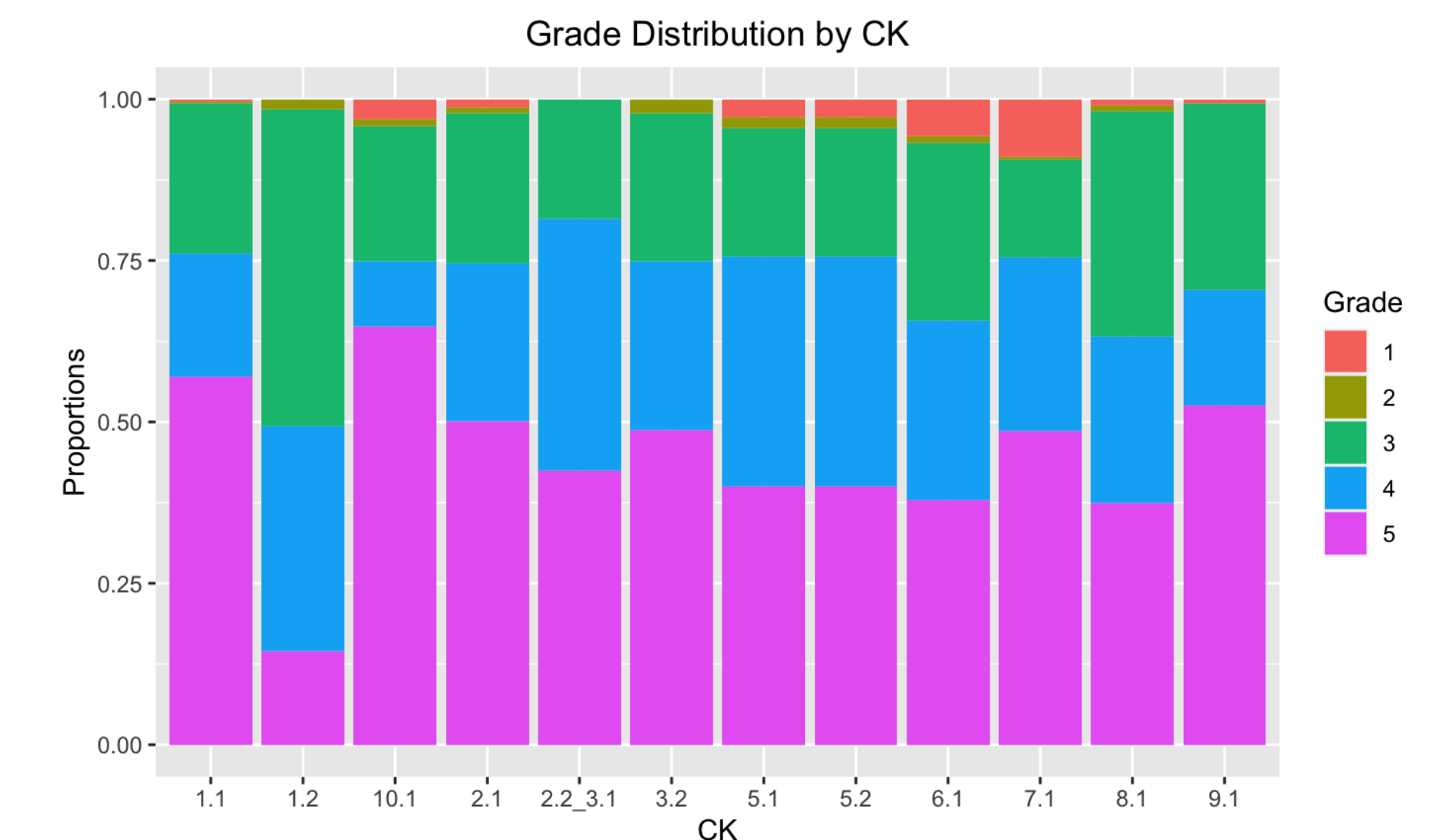
Key (Grade): Rachel's Initial Score, Lauren's Initial Score, Final Agreed Score

WINTER 2021 AGREEMENTS RATE:

CK (Winter 2021)	Agreement Rate
1.1	100%
1.2	100%
2.1	99.37%
2.2_3.1	99.64%
3.2	99.68%
5.1	100%
5.2	98.57%
6.1	100%
7.1	99.59%
8.1	99.68%
9.1	99.64%
10.1	100%

Results: Grading Initial Answers

Grade Distribution by CK

This graph shows that there are certain CK's that tend to produce better responses than others. For example, CK 1.2 seems to have a smaller proportion of 5's than others. This is different than 10.1 which has mostly 5's. CK 10.1 is the last CKs and CK 1.2 is one of the first which indicates that students potentially have better initial answers towards the end of the quarter as opposed to the beginning.

Average Score by Post Order Across the CKs

Average initial score by collaborative key
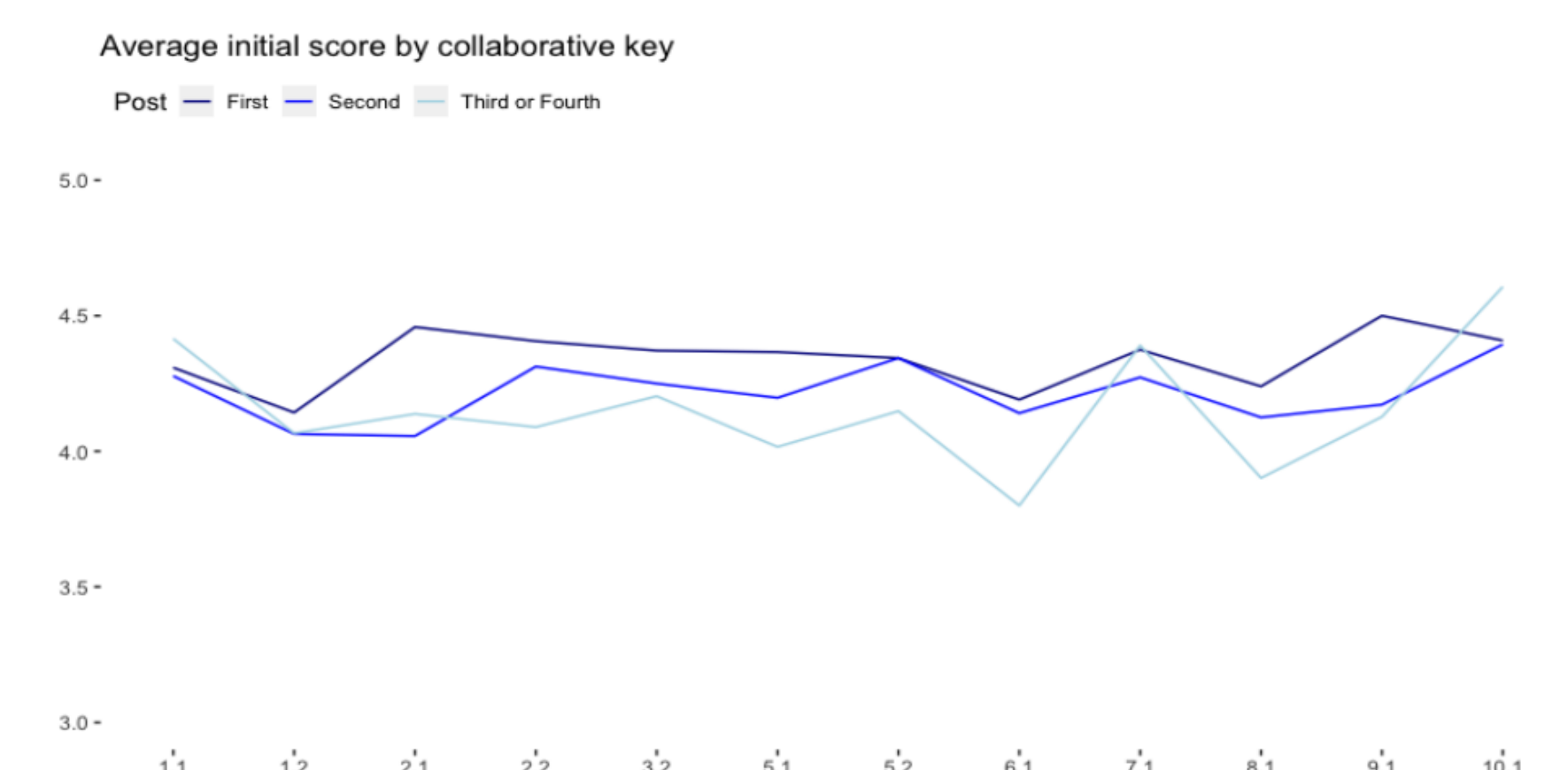
This graph indicates that overtime the students who answer first tend to do better overall than students who do not post first. This opens conversation about how students more eager to answer first or complete their collaborative key first produce better responses.

Literature cited

Community of Inquiry (CoI; e.g., Rourke et al.1999; Garrison et al. 1999, 2001; Akyol and Garrison 2013)

Nandi, D., Hamilton, M., & Harland, J. (2012). Evaluating the quality of interaction in asynchronous discussion forums in fully online courses. Distance Education, 33(1), 5-30.

Acknowledgments

Next Steps

- This research continues through the year, so there is still much more to be discovered
- Coding social presence and cognitive presence to use for full assessment
- Investigating order to see if there is a relationship between order and final grades