Investigating Students' Interactions in Online Written Assignments

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Data Collection- Explained

- Where did our data come from?
- A week in the life of these students looks a little something like this:
  - Activity assignment based on the weeks material
  - Collaborative key with group members from class
  - Watch wrap-up videos or go over material
  - Discuss with group members
  - One final group answer

Part 1: Can Dogs Understand Human Cues?

Dogs have been domesticated for about 14,000 years. In that time, have they been able to develop an understanding of human gestures such as pointing or glancing? How about similar nonhuman cues? Researchers Udell, Giglio, and Wynne tested a small number of dogs in order to answer these questions. In this exploration, we will first see whether dogs can understand human gestures as well as nonhuman gestures. To test this, the researchers positioned the dogs about 2.5 meters from the experimenter. On each side of the experimenter were two cups. The experimenter would perform some sort of gesture (pointing, bowing, looking) toward one of the cups or there would be some other nonhuman gesture (a mechanical arm pointing, a doll pointing, or a stuffed animal looking) toward one of the cups. The researchers would then see whether the dog would go to the cup that was indicated. There were six dogs tested but we will look at one of the dogs (a four-year-old mixed breed named Harley). Each trial involved the experimenter bowing toward one of the cups to see whether Harley would go to that cup.

STEP 1: State the research question: Can dogs understand human cues?

STEP 2: Design a study and collect data. Harley was tested 10 times and 9 of those times he chose the correct cup.

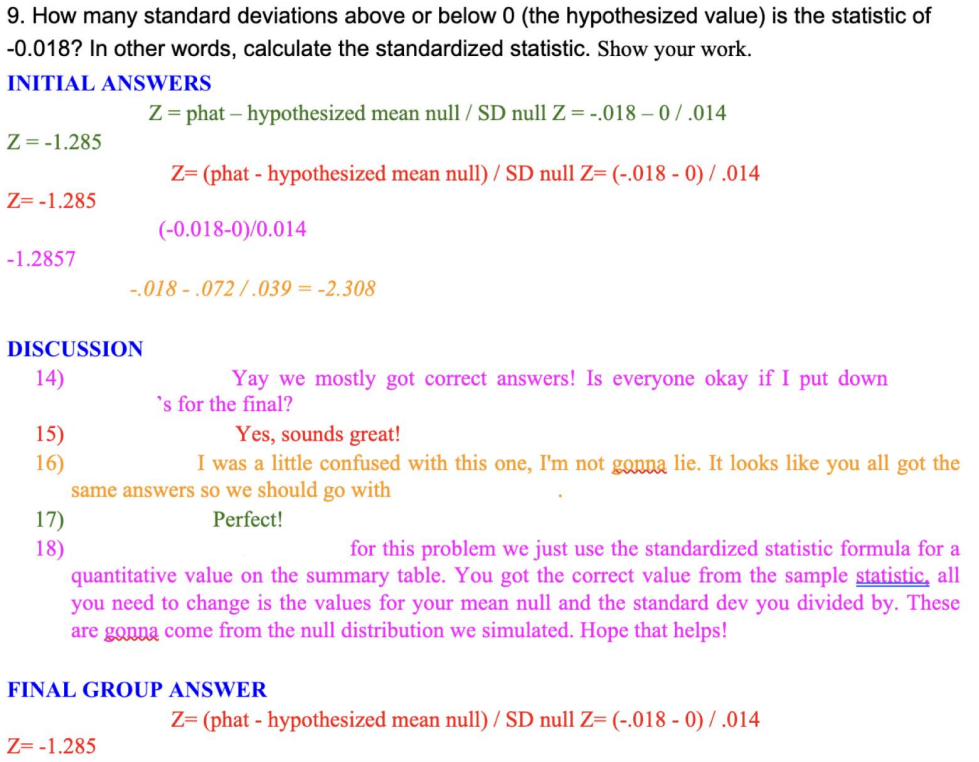
1. Identify the *observational unit* and the *variable* in the study. Is this variable quantitative or categorical? What are the possible levels of this variable?

   Observational unit: *one attempt from Harley*

   Variable: *Whether Harley chose the correct cup*
   Levels: *correct or incorrect*
   Type: *categorical*

What is a Collaborative Key (CK)?

- Simply Google Docs containing 6-13 statistical questions that will be answered by the students (in groups of 3-5)
- Cooperative learning structure that encourages students to work together to achieve the shared goal of having a rubric for each of the questions



9. How many standard deviations above or below 0 (the hypothesized value) is the statistic of -0.018? In other words, calculate the standardized statistic. Show your work.

INITIAL ANSWERS

Z = phat – hypothesized mean null / SD null Z = -.018 – 0 / .014

Z = -1.285

Z= (phat - hypothesized mean null) / SD null Z= (-.018 - 0) / .014

Z= -1.285

(-0.018-0)/0.014

-1.2857

-.018 - .072 / .039 = -2.308

DISCUSSION

14) Yay we mostly got correct answers! Is everyone okay if I put down 's for the final?

15) Yes, sounds great!

16) I was a little confused with this one, I'm not gonna lie. It looks like you all got the same answers so we should go with .

17) Perfect!

18) for this problem we just use the standardized statistic formula for a quantitative value on the summary table. You got the correct value from the sample statistic, all you need to change is the values for your mean null and the standard dev you divided by. These are gonna come from the null distribution we simulated. Hope that helps!

FINAL GROUP ANSWER

Z= (phat - hypothesized mean null) / SD null Z= (-.018 - 0) / .014

Z= -1.285

Literature Reviews

- Articles that investigated students' interactions in online discussions
  - "good" and "bad" interactions between students online
- Purpose of finding these articles
  - Importance of learning from others
- Big idea: Create a framework to assess students' interactions/participation/collaboration

Literature Reviews- Sources

- 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.
- Raković, Marzouk, Z., Liaqat, A., Winne, P. H., & Nesbit, J. C. (2020). Fine grained analysis of students' online discussion posts. *Computers and Education*, 157, 103982.
- Conaway, R. N., Easton, S. S., & Schmidt, W. V. (2005). Strategies for enhancing student interaction and immediacy in online courses. *Business communication quarterly*, *68*(1), 23-35.
- De Wever, Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers and Education, 46*(1), 6–28. https://doi.org/10.1016/j.compedu.2005.04.005
- Nandi, D., Chang, S., & Balbo, S. (2009). A conceptual framework for assessing interaction quality in online discussion forums. Same places, different spaces. Proceedings ascilite Auckland, 7-23.
- Tawfik, A., Reeves, T, Stich, A., Gill, A., Hong, C., McDade, J., Pillutla, V., Zhou, X., & Giabbanelli, P. (2017). The nature and level of learner–learner interaction in a chemistry massive open online course (MOOC). *Journal of Computing in Higher Education*, *29*(3), 411-431.
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The internet and higher education*, *2*(2-3), 87-105.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research, 17*, 397–431.

Literature Review - Findings

- Online learning increases the opportunities for learner participation and enhances the participation of learners who may feel more inhibited to engage in discussions in a traditional classroom setting (Dengler, 2008).
- For learning to be successful, it is required a continuous conversation and interaction, not just between teacher and learner, but also amongst the learners and learner has to act and reflect (Brown and Campione, 1996)
- Learner–learner interaction was limited to sharing and comparing information (lower level engagement); changed (decreased) over time; and was heavily dependent on a few highly-engaged learners (Tawfik et al., 2017)

Process of Creating Rubrics for Initial and Final Answers in CKs

Groups:

Spring 2021: 1, 4, 7, 14, 20

Grading:

- ***1: Blank/no answer***
- ***2: "I don't know" type answer***
- ***3: Completely Wrong answer***
- ***4: Partially Correct (but not perfect)***
- ***5: Correct***

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

This is good. I think that common mistakes I see in this type of question is students saying validity conditions are met, but they don't refer to sample results (63 and 15) or they don't identify what a "success" and "failure" are. This could be what differentiates between a 4 and a 5.

Grading Process

- We begin by grading initial answers separately for the sake of reliability
  - 1, 2, 3, 4, or 5
- Disagreements lead to discussion leading to final score for initial answers
- Initial answers are based on individual students
- Then we grade the final answers now that we have a solid scoring idea
- Final answers are based on each group

Comparing Answers

GroupCK.5.	Q2.Grade	Q3.Grade	Q6.Grade	Q9.Grade	Q11.Grade	Q13.Grade	Q14.Grade	Q18.Grade
3	4, 4, 4	3, 3, 3	5, 5, 5	5, 5, 5	5, 5, 5	3, 3, 3	4, 4, 4	3, 3, 3
3	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	3, 3, 3	5, 5, 5	5, 5, 5
3	5, 5, 5	4, 4, 4	4, 4, 4	5, 5, 5	3, 3, 3	4, 3, 4	5, 5, 5	3, 3, 3
5	4, 4, 4	3, 3, 3	3, 3, 3	3, 3, 3	3, 3, 3	4, 4, 4	4, 4, 4	3, 3, 3
5	4, 4, 4	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	3, 3, 3	5, 4, 4	5, 5, 5
5	4, 4, 4	3, 3, 3	5, 5, 5	2, 2, 2	3, 3, 3	3, 3, 3	3, 3, 3	3, 3, 3
9	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5
9	3, 3, 3	4, 4, 4	5, 5, 5	4, 4, 4	5, 5, 5	4, 4, 4	5, 5, 5	3, 3, 3
9	3, 3, 3	3, 3, 3	3, 4, 3	4, 4, 4	3, 3, 3	3, 3, 3	5, 5, 5	3, 3, 3
9	4, 4, 4	3, 3, 3	5, 5, 5	4, 4, 4	5, 5, 5	3, 3, 3	5, 5, 5	5, 5, 5
10	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5
10	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5
10	4, 4, 4	3, 3, 3	5, 5, 5	4, 4, 4	5, 5, 5	3, 3, 3	5, 5, 5	5, 5, 5
11	5, 5, 5	3, 3, 3	5, 5, 5	5, 5, 5	5, 5, 5	3, 3, 3	4, 4, 4	5, 5, 5
11	4, 4, 4	3, 3, 3	4, 4, 4	5, 5, 5	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5
13	4, 4, 4	3, 3, 3	4, 4, 4	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5
13	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	4, 3, 3	5, 5, 5	5, 5, 5
13	4, 4, 4	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5
15	5, 5, 5	3, 3, 3	5, 5, 5	4, 4, 4	5, 5, 5	5, 5, 5	5, 5, 5	5, 5, 5

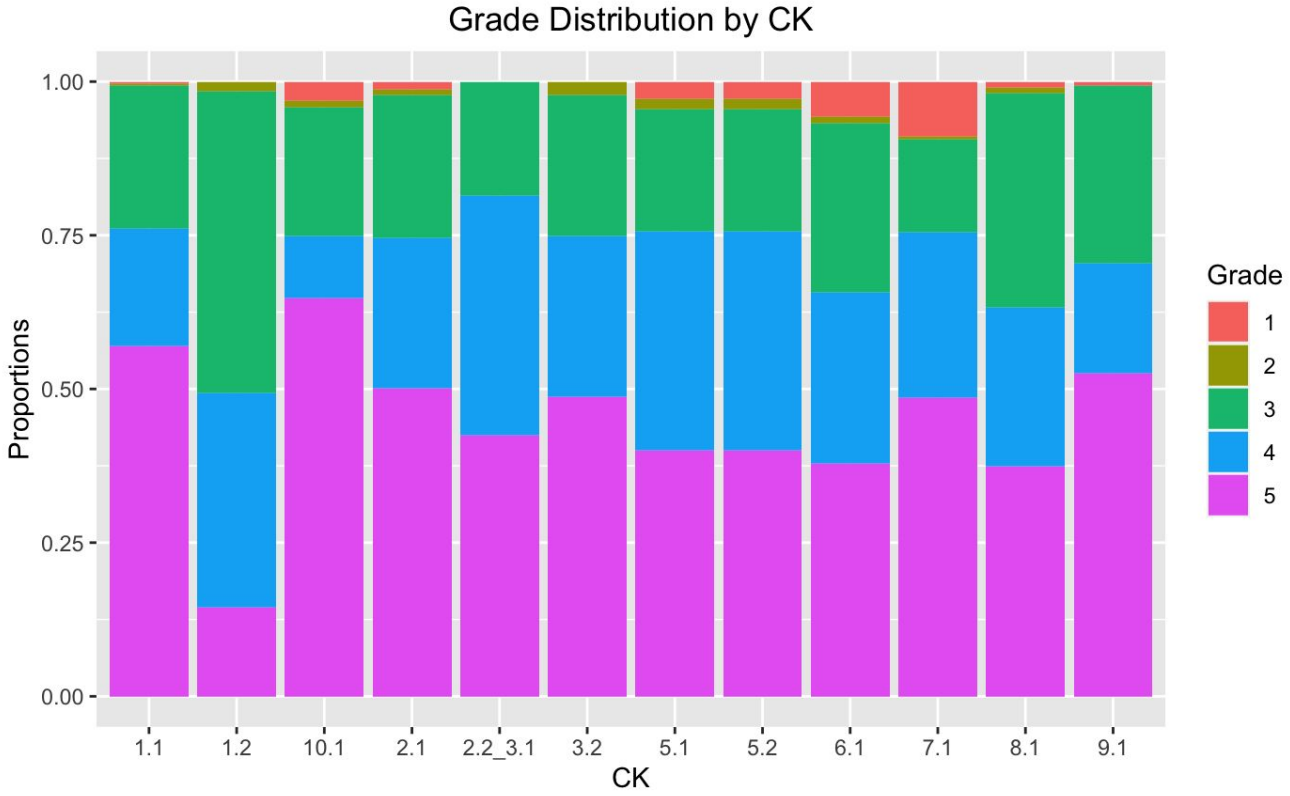
Note: Each observation / row signifies a student

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%

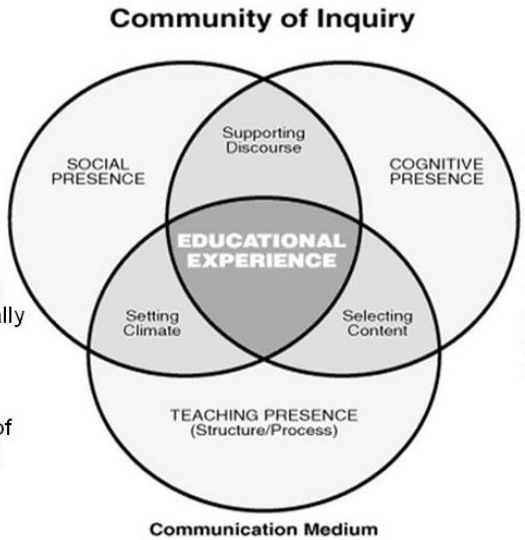
Visuals of Graded Initial Answers



Framework: Community of Inquiry

- An educational community of inquiry is a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding
- The Community of Inquiry
  - learning experience through the development of three interdependent elements – social, cognitive, and teaching presence

Framework: 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)

Social presence

- **Social presence** is “the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities” (Garrison, 2009, p. 352). So social presence is the ability of learners to engage socially and affectively in a community of inquiry. It is the ability of learners to project their personal characteristics into the community of inquiry, thereby presenting themselves as 'real people.'
- Ex:"I knew I had the wrong answer because it didn’t follow the same one as the simulation, but looking at your guys’ processes I understand the formula a lot better. Good job guys."
- Ex:"I did the calculations wrong but I agree with you we just gotta change the first two numbers."

Teaching presence

- **Teaching Presence** is the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Anderson, Rourke, Garrison, & Archer, 2001).
- Ex:"Based off the wrap up my numbers look off "
- Ex: "I agree after watching the wrap up, I did this one wrong. "
- Ex: "I did this wrong as well, as she explained when we plug in 0 into the footlength, we would get 38.30 in."

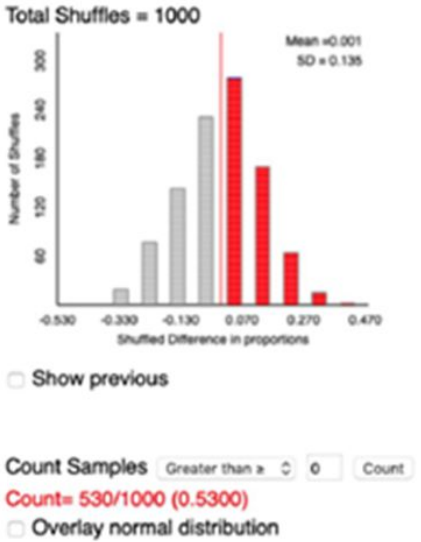
Cognitive presence

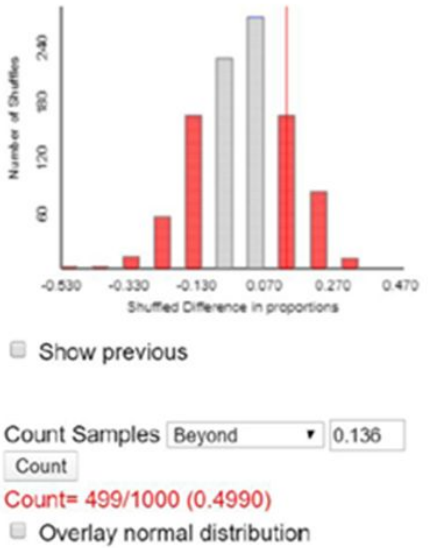
- **Cognitive Presence** is the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse (Garrison, Anderson, & Archer, 2001).
- Example can be seen on the next slide

INITIAL ANSWERS

9. Use the applet to find the p-value. Sketch or take a screen shot of the plot with the highlighted area used to calculate the p-value. Make sure the screen shot shows the p-value. Report the p-value.

Hannah: The p-value I obtained is 0.530.





Elise:

DISCUSSION

Hannah: Both of our distributions are correct in the sense that we both obtained a p-value close to 0.5. However, in my distribution I was confused about whether or not it was 2-sided, so I did not make my distribution 2-sided which led me to an incorrect answer.

Elise: I think you also put in the wrong statistic? The null hypothesis is 0, but the statistic is not.

Hannah: I agree, I think my statistic may be wrong as well. I was confused about how to make the distribution for this question and I think I assumed to put the null hypothesis as the statistic I guess, I was pretty confused. I think your graph looks correct. Now I see from the wrap-ups that the statistic should in fact be 0.136.

Elise: Yeah, I did that as well too and first tried to put in the number 0 but realized that it was not a statistic.

Coding of Teaching Presence

- Reference to videos/video wrap-ups
- Reference to the professor
- Reference to textbook or other course materials (not videos)

DISCUSSION

1) after watching the wrap up i think is right because I think i defined the variable incorrectly there should only be 2 choices whether he chose the correct cup or not.
2) I believe our answers are all in the same aspect, I agree we can use my answer if we are all on the same page. The only thing would be that we can take off the last part of my answer just because I am not so sure it fits with the question.
3) I think all of our answers are right in saying that it would be categorical

FINAL GROUP ANSWER

The variable is categorical on whether the dog chose the correct cup or not.

13. Consider the graph from #11.
    a) **Using the context of the problem**, explain what a dot on the plot represents.

INITIAL ANSWERS

A dot on the plot represents one instance of each number of correct attempts

A dot on the plot represents the amount of times Harley chose the correct cup out of 10 times. For example the one dot on top of the three represents that out of 10 tries Harley chose the correct cup three times once.

A dot on the dot plot represents how many times Harry got a cup right out of ten times

DISCUSSION

4) i think your right because i didnt contextualize with the problem but you did it very well!
5) I agree, we both are on the same track, the only thing is do you think we should put exactly the full answer I put or should we leave out the example part?
6) We are all correct but has a very good explinaation

CK	Group	Question	Post	Name	TP_videos	TP_instructor	TP_material
1.1	5	1	1		1	0	0
1.1	5	1	2		0	0	0
1.1	5	1	3		0	0	0
1.1	5	13	4		0	0	0
1.1	5	13	5		0	0	0
1.1	5	13	6		0	0	0
1.1	5	14	7		0	0	0
1.1	5	14	8		0	0	0
1.1	5	14	9		0	0	0
1.1	5	14	10		0	0	0
1.1	5	17	11		0	0	0
1.1	5	17	12		1	0	0
1.1	5	17	13		0	0	0
1.1	5	19	14		0	0	0
1.1	5	19	15		0	0	0
1.1	5	19	16		0	0	0
1.1	5	19	17		0	0	0
1.1	5	6	18		0	0	0
1.1	5	6	19		0	0	0
1.1	5	10	20		0	0	0
1.1	5	10	21		0	0	0
1.1	5	10	22		0	0	0

Moving forward

- This research continues through the year
- Coding social presence and cognitive presence
- Investigating order

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THANK YOU!