

Title of Study: *Critical Thinking Using an Online Discussion Forum with Fourth Graders*

Date of Study: *November, 2013 – February, 2014*

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Problem that was addressed: *Poor performance of 4th and 5th grade students in open response assessments in mathematics.*

Subjects (complete, as appropriate): *4th grade students at a public magnet school*

Racial/Ethnic: *66% White, 17% Latino, 9% Asian, 8% Other.*

Academic level: *Half were identified as gifted. Previous CST results: 72% proficient in ELA, 91% proficient in math.*

Other: *31 students made up the Control group, 63 in the Treatment group. Also involved 3 teachers, principal and a PTO parent.*

Hypotheses:

- *Students will give more detailed responses to critical thinking questions when they use an online discussion format.*
- *Student response behavior will carry over into individual responses when not using the online discussion forum*
- *Students will be more motivated to respond to critical thinking prompts when they are replying to an online discussion as opposed to typing out individual responses*

Data that indicated a need existed:

February, 2013: *27% of 91 4th graders proficient on mid-year open response assessment in math*

September, 2014: *18% of new 4th graders proficient on mid-year open response assessment in math*

Intervention:

- *Initially, we discussed what constitutes “quality discussion responses” with students and gave positive reinforcement, as deserved.*
- *Baseline established for number of reasons students used to support their response to critical thinking prompts.*
- *Treatment group was given access to internet discussion forum and asked to justify responses to questions; responses from both groups collected and number of valid reasons counted.*
- *Outcomes were measured using the number of reasons and evidence cited in responses. Data from groups was collected and compared twice during semester.*

- *If outputs were not met, checked on fidelity by teachers and observed/coached, as needed, or adjusted instruction.*
- *Worked with teachers to create critical-thinking questions and a scoring rubric; I also asked teachers for weekly updates.*
- *Principal facilitated planning time, helped review data, and worked with PTO to buy a class set of iPads.*
- *Treatment lasted 8 weeks with 16 opportunities for students to respond to critical thinking prompts. Half the prompts (one per week) given for homework (to be given out on Mondays and can be turned in any time during the week).*
- *Treatment group responded to prompts on Edmodo, an internet discussion forum. The Control group received the same prompts but did not read each other's responses; they typed out responses and printed them (for in-class assignments) and wrote them by hand (for homework assignments).*

Results:

	<i>Control Group (Before/After)</i>	<i>Treatment Group (Before/After)</i>
<i>Avg # of Valid Responses</i>	<i>3.03/4.03</i>	<i>3.25/3.69</i>
<i>Days between assignments given out/returned</i>	<i>2.76</i>	<i>1.81</i>
<i>Parents-homework interest (lower number = more interesting)</i>	<i>2/2.22</i>	<i>2/1.63</i>
<i>Parents-homework challenge level (lower number = more challenging)</i>	<i>2.33/2.06</i>	<i>2.33/2.44</i>
<i>Parents-homework value (lower number = more valuable)</i>	<i>1.46/1.82</i>	<i>1.46/1.81</i>
<i>Avg # of Valid Responses on 4 collected samples</i>	<i>2.56</i>	<i>1.92</i>

Conclusions:

What worked?

- *Results from student interviews suggest potential use as a scaffolding tool for increasing student learning. Students who need it may view other students' arguments before crafting their own. This practice also relates to CCSS mathematical practices and anchor standards for ELA regarding the critiquing of arguments. When taking the Smarter Balanced Assessments, students will have practice on the techniques used for testing.*

- *Students showed a higher level of interest and motivation to respond to critical thinking prompts in the online discussion format. They did their homework sooner. In interviews, they reported a high level of interest and motivation.*
- *Parents responded favorably to the online homework. Students needed less help from parents when they could read their peers' responses.*

What did not work?

- *Students in the control group wrote more thoughtful responses overall, matching or exceeding the treatment group's number of valid reasons.*
- *The control group exhibited more growth from the pre-assessment to the post-assessment. This does show, however, that practicing this type of writing may help students improve responses over time.*

Recommendations:

- *More guidance is needed to help students craft thoughtful responses when posting to an academic discussion forum. Teachers may want to share guidelines, rubrics and class exemplars with students and parents.*
- *I recommend that teachers use discussion forums with "nested" responses so that students can easily see when someone has critiqued their arguments.*

Research base:

Research has shown that online, asynchronous discussion forums can enhance critical thinking (Chen and Chiu, 2006; Jahnke, 2010; Guiller, Durndell, and Ross, 2008); Riley, 2006). The online format allows for more student involvement, including for English Learners and those who are more reticent in classroom settings (Risopoulos and McCarthy, 2009)