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Claim, Evidence, and Reasoning: Evaluation of the Use of Scientific Inquiry to Support Argumentative Writing in the Middle School Science Classroom

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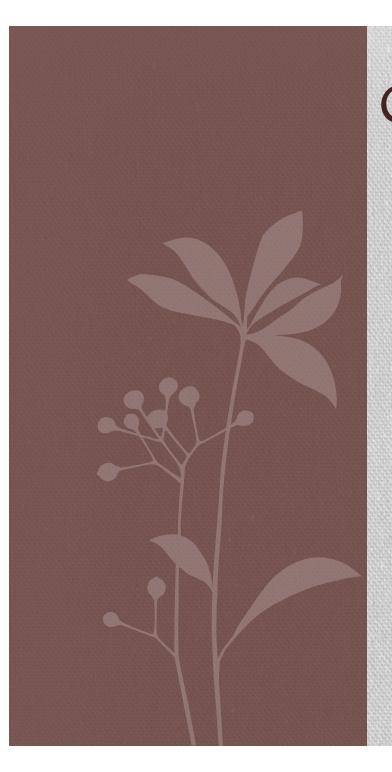
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CLAIM, EVIDENCE, AND REASONING

Evaluation of the Use of Scientific Inquiry to Support Argument in the Middle School Science Classroom

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Argumentative Writing in Science

Next Generation Science Standards

- Inquiry and literacy
- "Engage in argument through evidence" (NRC, 2012)

Students struggle with science writing tasks.

- General lack of support for writing in science curriculum (Kiuhara, Graham and Hawken, 2009)
- Need for more specialized teaching methods (Norris & Phillips, 2003)

Purpose

Evaluate a methodology for inquiry-based writing exercises in the middle school science curriculum

- Common successes and deficiencies
- Inform further argumentative writing instruction in science curriculum

Literature Review

- NGSS and CCSS have altered the roles of inquiry and collaboration in the classroom.
- 2. Inquiry + communication → meaning-making
- 3. Students can combine scientific inquiry and evidence to create and defend arguments in written form.
- 4. Argument-Driven Inquiry can be used as a model to implement these teaching practices. (Sampson, et al., 2013)
- 5. Limitations include self-efficacy, a bias against science literacy, and budgetary and professional development issues.

Modified Sequence of Instruction

- Before engaging in argumentation, students are given support with writing a scientific claim.
- Class-wide argumentation session
 - Monitor discussion
- Reflective discussion occurs throughout instruction

Data

- 1. Reading Assessment Identify, Critique, and Compare Evidence (adapted from Knight, et al., 2013)
 - Administered pre-and post-instruction
- 2. Writing Assessments (claim, evidence, and reasoning)
 - **Summative**: Pre- and post-instruction (adapted from Knight, et al., 2013)
 - Formative: Paragraphs written throughout instructional sequence
- 3. Student survey via Google Forms
 - Writing strengths/weaknesses
 - Experience with claim, evidence, and reasoning; peer review

Data Analysis Themes

- Inquiry-based argumentative writing instruction increases students' ability to identify, critique, and compare the quality of evidence in written arguments.
- Participation in inquiry-based argumentative writing exercises helps to strengthen students' scientific claims.
- Students' writing scores increase when scaffolded to meet expectations.
- 4. Students need continuous feedback in order to improve as writers.

Suggestions for Future Instruction

- Data that is personally meaningful to students
- Argumentation sessions that allow for student/ teacher feedback on evidence and reasoning, as well as claims
- Lab analyses scaffolded to areas of student need
- Clear expectations for meaningful peer feedback



QUESTIONS ???

References

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