

Relevant-Supporting Evidence when Writing Scientific Arguments

At the lowest level of this construct map, the student does not provide any evidence (level 0). Students, whose ability is at level 1, include some irrelevant and non-supporting statements in addition to relevant-supporting evidence. The research on students' abilities to use evidence when writing scientific arguments suggests that students usually try to use data as evidence (Sandoval & Millwood, 2005), but routinely use irrelevant evidence (Kuhn & Reiser, 2005; McNeill & Krajcik, 2007; Sandoval, 2003). When students are able to limit their evidence to that which is only relevant to and supportive of the claim, then their ability is at level 3. As was the case with the writing forms of justification construct map, critique only occurs at the highest level. To be able to limit the evidence, suggests that the student had to first critique the evidence.

Relevant-supporting evidence construct map for the writing assessments

Level	Description
High  3	RSE for Science & Claim Student limits all of the empirical evidence to that which is relevant to the science in the claim and supports the relationship in the claim.
2	RSE for Claim Student limits all of the empirical evidence to that which supports and is relevant to the relationship in the claim.
1	Some RSE Student provides a mixture of relevant-supporting empirical evidence as well as irrelevant and/or non-supporting data to support the relationship in the claim. OR Student only provides some of the necessary relevant-supporting empirical evidence to support the relationship for part of the claim.
Low	

References:

- Kuhn, L., & Reiser, B. (2005). Students constructing and defending evidence-based scientific explanations. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Dallas, TX.
- McNeill, K. L., & Krajcik, J. (2007). Middle school students' use of appropriate and inappropriate evidence in writing scientific explanations. In M. Lovett & P. Shah (Eds.), *Thinking with data: The proceedings of the 33rd Carnegie symposium on cognition*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Sandoval, W. A. (2003). Conceptual and epistemic aspects of students' scientific explanations. *Journal of the Learning Sciences*, 12, 5-51.
- Sandoval, W. A., & Millwood, K. A. (2005). The quality of students' use of evidence in written scientific explanations. *Cognition and Instruction*, 23(1), 23-55.