

Relevant-Supporting Evidence when Reading Scientific Arguments

Our reading relevant-supporting evidence construct map was developed from the literature as well as from the expertise of our team. In regards to the literature, there is very little research that has examined students' abilities to critique the quality of evidence in scientific arguments they have read. Specifically, the findings from one research team suggest that high school students' struggle to identify evidence when reading science news articles (Phillips & Norris, 1999; Norris & Phillips, 1994). This suggests that locating evidence within a text could be problematic for students, and, therefore, these studies informed the lower border of our construct map. Specifically, students whose ability is at level 1 are able to locate evidence when reading a scientific argument, whereas the ability of students who are not able to locate the evidence are below level 1.

Informing the upper border of our construct map, the argumentation literature posits critique as a difficult skill (e.g. Osborne et al., 2004). While the findings from one study suggest that some middle school students were able to critique extrapolations made from the evidence they read in a scientific news article (Ratcliffe, 1999), other studies suggest that critiquing evidence can be challenging. Specifically, students' tend to use irrelevant evidence (Kuhn & Reiser, 2005; McNeill & Krajcik, 2007; Sandoval, 2003) and rarely interpret the meaning of evidence or explain why it counted as evidence (Sandoval & Millwood, 2005) when constructing scientific arguments. Therefore, it is not until levels 3 and 4 that students are able to critique the quality of relevant-supporting evidence. Whereas the students whose ability is on target with level 4 can compare the quality of two arguments based on critiques of the relevance and support of the evidence, students whose ability is on target with level 3 can only critique the quality of evidence based on relevance and support within a single argument.

However, our experience also tells us that there seems to be a wide gap between the difficulty of locating relevant-supporting evidence (level 1) and critiquing relevant-supporting evidence (levels 3 and 4). We postulate that this in-between step would be to select new relevant-supporting evidence when provided with multiple options. This is supported by research that suggests that students tend not to recognize observations as relevant qualitative evidence or reference lack of data as evidence that was relevant to discount claims (Sandoval & Millwood, 2005). Therefore, students who are able to identify relevant-supporting evidence are on target with level 2.

Relevant-supporting evidence construct map for the reading modality

Level	Description
High 3	Compares & Critiques Student critiques the evidence in two related arguments based on both relevance and support.
2	Critiques Student critiques evidence in one argument based on both relevance and support.
1 Low	Identifies Student identifies new relevant-supporting evidence

References:

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