The Iterative Development of a Learning Progression Assessment Tool

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Background

National science standards call for the development of complex thinking and reasoning skills by providing students opportunities to engage in practices such as asking questions, collecting and interpreting data, and explaining results. American Association for the Advancement of Science (1993) has described these skill sets as critical elements of good science instruction. In work that is addressing these needs for science education, the ZoBio2025 initiative has developed learning progressions that consist of a content progression and an inquiry reasoning progression. Learning progressions are successively more sophisticated ways of thinking about a topic that can be used as templates for the development of curricular and assessment products. Learning progressions drive curricular and assessment products and are one of several possible manifestations of a given learning progression. The learning progression can only be evaluated indirectly, through the evaluation of the curricular products, professional development modules, and assessment instruments that are constructed from the learning progression template (Songer, Kelcey, & Gotwals, in press).

Using our learning progression template, we designed a set of tasks that plugged into the content and reasoning progression modules. In order to gather rich evidence of how students at multiple ability levels construct scientific explanations, we created three ability levels of tasks based upon degree of scaffolding.

What types of tasks can elicit student understanding and skills?

Tasks that provide students of many ability levels with opportunities to show what they know:

Students were most successful in items with novel content when provided with scaffolding.

Additionally, varying the degree of scaffolding allows learners more opportunities to articulate the middle knowledge between declarative fact and generating unscaffolded evidence-based explanations.

To attend to this, our revised assessment includes another level of scaffolding.

Tasks that have a high degree of curricular sensitivity to avoid student confusion and results distortion:

The first-round items were not processed in the format the students were used to seeing; therefore, we do not focus on fading that particular support in our curriculum, we redesigned our second-round items to resemble the curricular activities.

Tasks that align with the cognitive processes of the learners:

Think alouds and cognitive interviews revealed that students need to articulate their reasoning before their evidence. Our revised items reflect this.

References


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