

Improving Science Education in International Schools Through Professional Development Targeting Next Generation Science Standards Assessment Design



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Research Question:

How does professional development mediated by the use of a screening tool (3D-PAST) enhance and/or challenge science teachers' understandings of the Next Generation Science Standards (NGSS) in American international schools?

Intervention:

Professional development targeting NGSS PE assessment design, leveraging the use of a screening tool to guide systematic critique of practitioner-designed assessments. Conducted in 15 American-curriculum international schools in 13 countries over 10 month period.

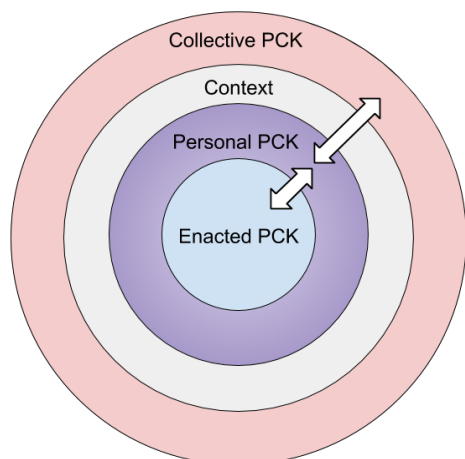
Findings:

- Enhanced Understanding of the NGSS's Three-Dimensional Framework
- Elicitation of Changes in Professional Practice
- Facilitation of Collaborative Practice
- Influence of the Intervention Moderator

Three-Dimensional Performance Assessment Screening Tool (3D-PAST)

- 1. The **prompts** match the **Science and Engineering Practice (SEP)** and engage students in sense making.
- 2. The **stimuli** have the required information needed to utilize the **SEP**. (e.g., data for analysis)
- 3. The **stimuli** have multiple and sufficient information needed open up the **SEP**. (a rich task)
- 4. The **prompts** elicit observable understanding of the **Disciplinary Core Idea. (DCI)**
- 5. The **prompts** include the **Crosscutting Concept. (CCC)**
- 6. The **prompts** include language (i.e., bullets) from grade appropriate progressions. **(DCI)(CCC)(SEP)**
- 7. The **prompts** include graphic organizers.
- 8. The **entire assessment** contains information that is scientifically accurate and properly attributed.
- 9. The **prompts** points in the direction of explaining the phenomenon or designing a solution.
- 10. The **phenomenon** or **problem** is authentic, interesting, and requires students to figure something out.
- 11. The **phenomenon** or **problem** is novel to show the transfer of knowledge. (e.g., not in the unit)

Refined Consensus Model of Pedagogical Content Knowledge



Implications for Practice:

- International school science teacher PD should train teachers in the use of aids to align NGSS assessments.
- Evaluate and pursue PD as it pertains to enacted PCK
- Give consideration to contextual components of PD that influenced the assimilation of PCK.

Implications for Research:

- Contribution to nascent literature utilizing the RCM.
- Filling a void in international-school PD research.
- Encourage additional areas of action research
 - Most important aspects of moderator-teacher relationship
 - Use of assessment alignment-aids in other disciplines

¹ The NGSS Logo is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it.

² Three Dimensional Assessment Screening Tool. Courtesy, Paul Andersen. 2018. Available at <http://thewonderofscience.com>

³ Simplified Refined Consensus Model Diagram, Adapted from: Hume, A., Cooper, R., & Borowski, A. (2019). Repositioning Pedagogical Content Knowledge in Teachers' Knowledge for Teaching Science. (p. 81).