3-2020

How teachers understand the curriculum and frameworks they use

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Overview

- Background

- Method

- Findings

- Discussion

Background

- Science education increasingly includes inquiry, particularly in light of NGSS.
- Curricular frameworks support inquiry-based learning
  - BCBS 5E (Bybee, 2006)
  - NGSS Storylines (Reiser, 2013)
- Elementary science teachers rely heavily on curriculum materials (Appleton & Kindt, 2002; Eshach, 2003)
- Teachers need to adapt curriculum (Remillard, 2005) especially if presented in a different framework

Context

- Mid-sized city in the middle of the United States
- State science standards based on NGSS, but state did not adopt NGSS
- Teachers are pressured by districts and administration to follow district-adopted curriculum and pacing guides

- This study was part of a larger project, BODYMODELS, providing professional development to help elementary teachers learn biomechanics, and create and enact NGSS Storylines in their classes
- 19 teachers across several area school districts participated in a three-week summer institute followed by several Saturday workshops during the school year.

Method: Focus Group

- This focus group occurred during the third Saturday workshop. Eleven teachers were in attendance at this particular workshop (table in next slide).
- Teachers were directed to read an article from Science Teacher (Trauth-Nare, 2016)
- The workshop had focused on Storylines, but the article employed 5E as the framework
- The group discussed the article, led by one of the researchers. The discussion was recorded and transcribed.
- The transcript was collaboratively coded utilizing versus and process coding, then was analyzed by two researchers (Sweeney, 2013) in order to establish how teachers understood and confronted materials from the article and the differences in frameworks

Participant's Pseudonym	Teaches	Years Teaching Experience	Leadership Role	Highest earned degree
Bailey	6th- 8th Grade	6	None	Bachelor's
Dawn	Kindergarten	11	District Science Leader	Master's
Heidi	6th Grade	10	None	Master's
Kacee	6th Grade	7	Technology Trainer	Master's
Kerri	6th- 8th Grade	2	None	Bachelor's
Lily	5th Grade	24	District Science Chair	Master's
Maddie	5th Grade	6	None	Master's
Mallory	3rd Grade	17	None	Master's
Peggy	6th Grade	9	District Science Leader	Master's
Sophia	6th Grade	5	Technology Trainer	Master's
Theodore	K-8 Art	41	Technology Trainer	Master's

Research Questions

- How did teacher participants think about using curriculum materials designed in a different framework than they use?
- What do teacher participants think the similarities and differences are between the 5E instructional model and NGSS Storylines?

How did teacher participants think about using curriculum materials designed in a different framework than they use?

- Finding 1: Teachers want to use materials that they see as immediately applicable but recognize the need to adjust for their own setting.

- Finding 2: Bigger issues than the framework affect adoption (Mallory & Kerri)

Finding 1a: Teachers want to use materials that they see as immediately applicable.

Such as full lessons they can implement:

"I just like it gives you mini lessons that you can do with the kids and they can explore it themselves, and of course with your guidance. But like, it's stuff you can do at school." - Sophia

Finding 1a: Teachers want to use materials that they see as immediately applicable.

Such as using examples from the materials in their own lessons:

"It uses like real-life examples, like, you know, a tennis racket or a boomerang or diving or just basic movements that you know, we could find examples to show students." - Dawn

Finding 1b: Teachers recognize the need to adjust for their own setting.

"And accommodate what fits their students the best, because if I have a student in crutches but we're trying to do a lunge, that's not really going to help that student, so I'm going to modify whatever I'm putting in here." - Kerri

Finding 2: Other issues than framework affect adoption of materials

Teacher and School Context:

"And a lot of it is that we're not respecting the time for math and sciences and we don't have the tools. And we don't have the training." - Mallory

Finding 2: Other issues than framework affect adoption of materials

Student Context:

"It's third grade, and if they haven't had any exposure, it's sad. It's really sad. I have kids who can't even do a puzzle – put pieces of a puzzle together. And that's a geometry skill! They don't have that visuospatial skill. They don't have that sense." -Mallory

What do teacher participants think the similarities and differences are between the 5E instructional model and NGSS Storylines?

- Finding 1: Neither framework provides usable lesson plans

- Finding 2: 5E matches the process of storyline

- Finding 3: Inquiry is ongoing in both, but they end in a different way

Finding 1: Neither framework provides usable lesson plans

"It's like the flowchart examples in Storyline. I guess [the article] is just more of like the procedural, I guess I kept thinking 'how would you?' I mean… [the authors] didn't write this up as a lesson plan" - Mallory

Finding 2: 5E matches the process of storyline

5E and Storyline have similar processes:

"So the Storyline is like pretty much like the 5E model, but with a fluid pattern where it meshes and comes back and does other things, but it's still the same five ideas are in Storyline, just re-visited, revamped, and changed." - Kerri

Finding 2: 5E matches the process of storyline

However, the elements are labeled differently; 5E is more explicit:

"The thing about the 5E is that it's just labeled more, where with the Storyline it kind of just flows." - Lily

Finding 3: Inquiry is ongoing in both

Initial inquiry drives more inquiry in both frameworks:

"It seems like it just keeps having the questions come up more and more. It's like yeah the initial inquiry, but it also produces more questions to keep doing it...So that's what I'm saying is that it does look like the Storyline to me with the 5Es because we do keep doing that, so I do see that. Storyline's like the 5E." - Peggy

Finding 3: Teachers disagree about if Storyline ends

Teachers disagree about whether Storyline actually concludes, but mutually agreed that 5E ends.

"But I feel like the 5E. Ok, it stops at that last E. Whereas the Storyline flows and will infinitely go." - Sophia

"[Storyline ends] when you have a solution to your question. When you can solve your question and you can get additional questions from your question." -Kerri

Finding 3: Inquiry is ongoing

Unlike 5E, inquiry may become unfocused in Storyline:

"The thing about that Storyline is that you do ask that question but then it expands out into so much" - Sophia

"It snowballs." - Heidi

Conclusions & Implications

- Teachers do seem able to think about using curriculum designed in different frameworks. They are used to finding and adopting materials that are imperfect - not the right curriculum, age level, etc.
- Because they do not see materials in the framework as directly useable - not lesson plans, not necessarily appropriate for their students - they are comfortable using materials independent of the framework, and do not particularly attend to the framework; other features are more important

Conclusions & Implications

- They are innately able to identify similarities between 5E and Storylines, possibly because the structures of the two frameworks are similar, it is unclear how flexible they would be with a very different framework.
- They prefer easy-to-use out-of-the-box offerings (lesson plans)

Acknowledgements

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