

Videocases for Science Teaching Analysis (ViSTA)

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Content Focus of the K-8 ViSTA modules:

1. Electricity
2. Plants
3. Force and motion
4. Water cycle
5. Inquiry

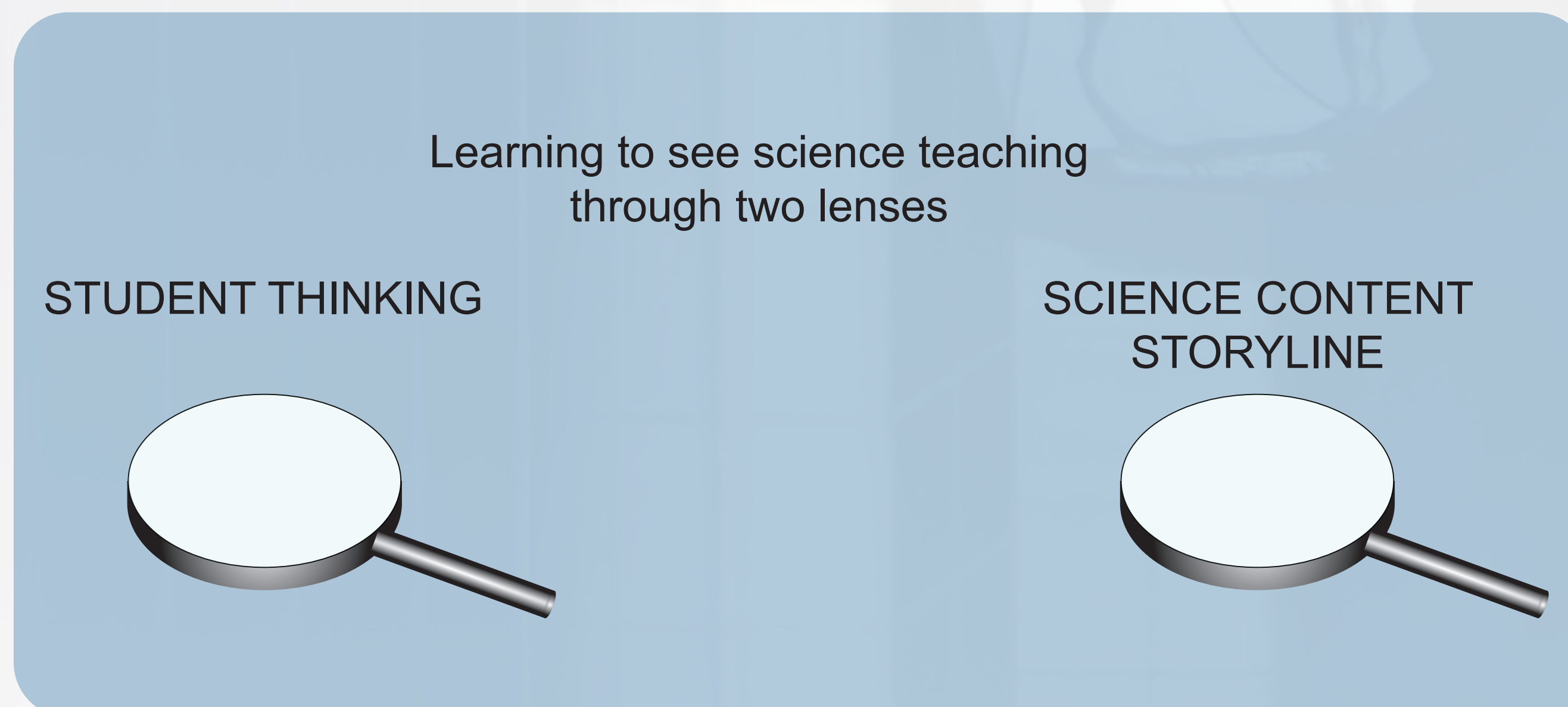


Project Goals

» To develop and study the impact of five on-line, video-based modules designed to provide preservice teachers (PTs) with the skills necessary to learn how to learn from analysis of K-8 science teaching.

Guiding Principles

- » Teachers need to develop strong science content understandings. This learning can take place in the context of analyzing cases of science teaching.
- » Teachers value watching science lessons taught by experienced teachers, but they need support in learning how to question and reflect, rather than simply imitate
- » Preservice teachers benefit from structured opportunities to analyze the same classroom several times through different lenses. In particular, preservice teachers benefit from looking at science teaching through a science content storyline lens and through a student thinking lens.



ViSTA Approach to Video-Based Preservice Teacher Learning

The Problem: Preservice teachers do not know how to learn from analysis of science teaching practice. They have spent years as students watching teachers at work. But research suggests that this apprenticeship of observation has not taught them how to be reflective and analytical. This problem is especially acute in the area of science, where preservice teachers often lack deep subject matter knowledge. As a result, when PTs look at science teaching they typically evaluate it in terms of what they like and dislike as a student and pay scant attention to issues at the heart of effective teaching, especially how the content ideas are organized and developed and how students are thinking about the science.

The ViSTA Approach: Preservice teachers can learn how to learn about content, students, and pedagogical content knowledge from analysis of science teaching practice when they are supported by:

- » Videocases that provide the opportunity for a shared field experience and collaborative analysis,
- » Videocases that are content focused, providing an opportunity to learn about the science content as well as the pedagogy,
- » An analysis cycle protocol that guides deeper analysis of teaching,
- » A conceptual framework that challenges preservice teachers to look at science teaching through new lenses: the science content storyline and student thinking, and
- » Scaffolded tasks that give preservice teachers practice in looking at science teaching more deeply and through two new lenses.

Intended Use of the Videocase Modules

» In teacher education programs, primarily as supplements in science methods courses.
» On-line and face-to-face. Preservice teachers watch videos and complete related tasks online as homework. Course instructors facilitate follow-up discussions in class. (about 15 hours in class, 15 hours homework).

Field Study

Sample:

- » Treatment group: Students enrolled in methods courses with experienced ViSTA instructors, using either the Electricity or the Plants module (N = 33 instructors)
- » Control group: Students enrolled in methods courses in which no ViSTA module is being used (N = 9 instructors).
- » Treatment group instructors teach at 33 colleges and universities from across the country. Control group instructors teach at 9 of the same institutions as treatment group instructors.

Research Questions:

- » Do the modules increase preservice teachers' content knowledge?
- » Do the modules affect how preservice teachers analyze science teaching videos? Do they pay increased attention to student thinking and content storyline lenses after use of the modules?

Results

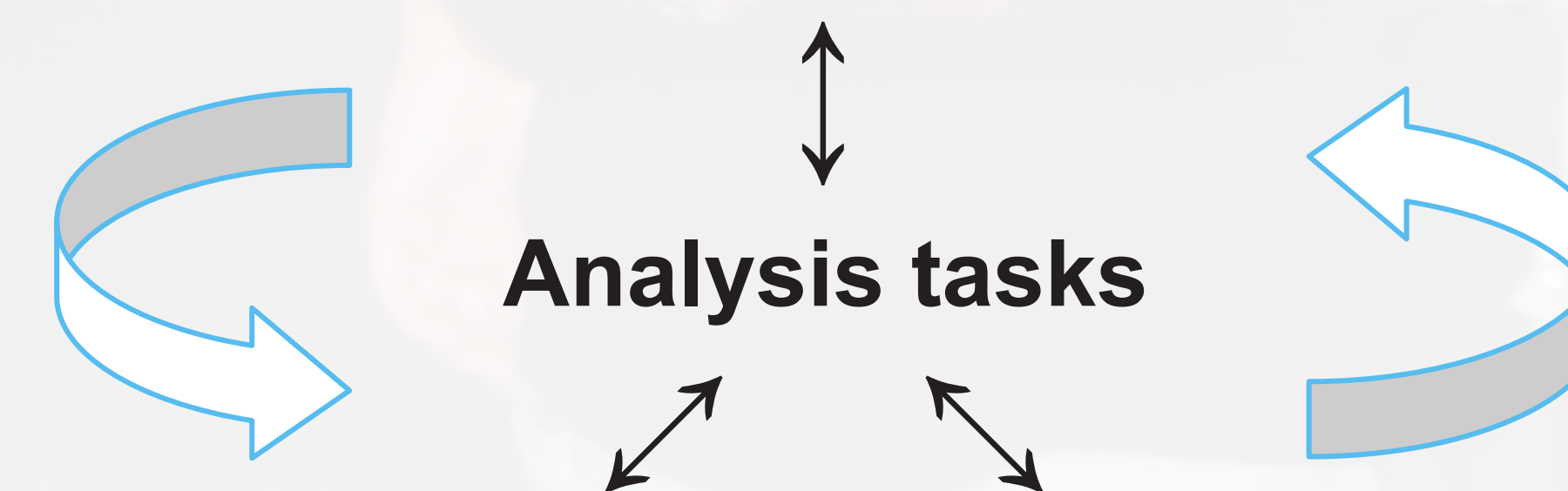
Preservice teachers using both modules reported a positive impact on their knowledge about student thinking about science content, their knowledge about science content coherence in lessons, and their readiness to teach this content.

HLM analyses indicate that participation in the ViSTA program positively and significantly predicted higher learning on preservice teachers' science content knowledge and their ability to analyze videotaped science lessons:

- » science content knowledge (p=.000, ES=.47),
- » lesson analysis of science content (p=.002, ES=.52),
- » lesson analysis of student thinking strategies (p=.021, ES=.27), and
- » lesson analysis of science content storyline strategies (p=.026, ES=.14).

Analysis cycle protocol

Observation – Claim – Evidence – Alternative



Videocase materials

- » Teacher lesson plans, textbook pages, worksheets
- » Video clips from science lessons
- » Video clips from teacher and student interviews
- » Student work and pre-/post-assessments

Key readings

- » Content – PCK
- » Strategies for making student thinking visible
- » Strategies for creating coherent science content storylines

