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Inquiry-based Content Immersion: Increasing Science Content Knowledge and Appreciation in Pre-service Elementary Teachers

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RESEARCH QUESTION

During summer 2014, as part of an alternate route teacher certification program, a cohort of 15 paraeducators enrolled in a hybrid science education methods/content immersion. The aim of the hybrid course was to help these paraeducators feel more comfortable engaging in scientific inquiry. Additionally, nearly all of the paraeducators were first generation college students so they had to navigate institutional, cultural, linguistic and relational borders to become certified elementary teachers.

Can a short intensive content immersion in science, followed by instruction in and practice teaching inquiry science, have a positive impact on the paraeducators feelings of self-efficacy as science learners and teachers?

RESULTS AND OBSERVATIONS

Student improvement on the content post-test exceeded expectations.
- Average pre-test scores: 46.8% correct; high score of 78.9% and low score of 26.2%.
- Average post-test score: 79.9% correct; high score of 94.7% and low score of 57.9%.
- Average improvement: 32.3 percentage points.

MORE Survey Results (Tables 1 & 2) determine statistical significance.
- Self-efficacy as a science learner (CLASS) scores increased significantly; along with two of the subcomponents (personal interest and real-world connection). (Table 2)
- Self-efficacy as a science teacher (STEBI_B) scores increased significantly. (Table 2)
- HRI survey results were more conflicted (see Table 2); potentially due to the ceiling effect noted by Horizon Research, Inc. Basically, para-educators may already have a relatively sophisticated view of learning theory aligned instruction.

Student Reflections
- Test results were supported by student statements:
  - “very exciting to learn and understand science because it has always been my biggest struggle.”
  - “I was responsible for my own learning and was backing my answer by using evidence.”

METHODS

- Four primary data sources:
  - pre- and post-test content assessments,
  - a survey,
  - instructor observations and
  - student reflections.
- The survey used was developed by the Model Of Research-based Education (MORE) team here at WWU and has been implemented successfully for 2 years.
- The MORE survey includes four targeted belief areas and makes use of three previously verified survey instruments as well as creating one novel target area. The survey and belief areas are summarized below in Table 1.

CONCLUSIONS AND TAKEAWAYS

- The paraeducator’s appreciation for inquiry-based pedagogy was enhanced through the content immersion.
- The content immersion was an effective way to improve the paraeducator’s content knowledge in a short time frame.
- Paraeducator’s feelings of self-efficacy as science learners and teachers increased.
- Rich inquiry-based instruction, while initially challenging, can be an effective method of instruction for all including ELL and bilingual students.

WHAT THE PAREUCATORS SAID ABOUT INQUIRY-BASED PEDIODY

- “The coolest thing I learned was that there are several ways to teach science (NOT just a textbook) through scaffolding.”
- “This kind of science is very colorful and has lots of dimensions. Science is just life, we’re just going deeper.”
- “Thank you...for reminding me that this world is beautiful and there is soooooo much we can learn from it every single day.”

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REFERENCES