Exploring Preservice Teachers’ Beliefs about Effective Science Teaching Through Their Collaborative Oral Reflections

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Introduction
Teaching effectiveness is increasingly highlighted as an important quality in teachers, and teacher education programs have used various approaches to improve preservice teachers’ teaching effectiveness. However, how preservice teachers develop their beliefs about effective science teaching and how they enact these in their field experiences have rarely been explored. To better support preservice teachers’ professional development, we investigated their beliefs about effective science teaching, by examining their discourses during collaborative oral reflection sessions in their early field experiences. We also highlighted the possibility of collaborative oral reflection as a medium for improving reflective experiences by evaluating the quality of the preservice teachers’ reflections.

Research Purposes & Questions

1. Research Purposes

1) We aim to explore the beliefs preservice teachers hold about effective teaching, science teaching in particular, and how they enact these in the classroom, by examining their discourses in collaborative oral reflection sessions.
2) We also aim to examine whether the format of collaborative oral reflection improves preservice teachers’ reflective practices.

2. Research Questions

1) How do collaborative oral reflections reveal preservice teachers’ beliefs about effective science teaching?
2) How do collaborative oral reflections demonstrate the quality of preservice teachers’ reflections?

Methods

1. Participants

The participants in this study were 17 preservice teachers enrolled in common sections of science and math courses, and sharing the same early field experiences at a large Midwestern university. All of them were in their junior year of the elementary school teacher education program. The participants were teamed up and placed in three fourth-grade classrooms in the same school.

2. Context of the Study

In their early field experience course, the preservice teachers visited their classrooms once a week for three hours and engaged in the four major activities described by Akerson et al. (2017): (a) formative assessment interviews (FAI), during which each pair of preservice teachers interviewed a pair of elementary students from their class; (b) construction of models of children’s thinking, during which preservice teachers created a predictive statement that could be used as a model of students’ thinking; (c) teaching a lesson; and (d) lesson study, during which preservice teachers discussed the lesson taught. (p. 301)

This model was iterative, and the teachers performed all four components every week throughout the semester. In this study, we focused on the (d) lesson study phase only and called it as “collaborative oral reflection” to avoid confusion with original Japanese-style lesson study used in Lewis and Tsuchiia (1998).

3. Data Collection

Nine collaborative oral reflections videotaped sessions by the three teams over three weeks were transcribed verbatim and used as the final data for this study.

4. Data Analysis

For the first research question, constant comparative analysis was used as an analytical tool, guided by grounded theory (Strauss & Corbin, 1998). Therefore, the coding scheme was not determined before the analysis; it was expected to emerge inductively (Engwand, 2013).

For the second research question, we analyzed all the participants’ utterances in the nine transcripts independently using Harland and Wondra’s (2011) four level framework, Depth of Reflection (DoR). It is presented on the left.

Results

1. Beliefs about Effective Teaching

1) Students’ Engagement: The term “engagement” has “behavioral (on-task attention, effort, persistence, lack of conduct problems), emotional (presence of interest and enthusiasm, absences of anger, anxiety, and boredom) and cognitive (use of strategic and sophisticated learning strategies, active self-regulation) aspects” (Reeve & Tseng, 2011, p. 257). However, the participants seemed to define the term only from behavioral and emotional perspectives.

2) Students’ Scientific Understanding: the participants discussed whether they observed their students’ engaging in scientific thinking processes or scientific knowledge construction as a result of their teaching.

3) Teaching Strategies: This theme was discussed in relation to the first and second themes as well. For example, the participants identified students’ lack of understanding of activities they led and discussed techniques for improving engagement and getting students involved in meaningful learning experiences.

The participants also discussed the extent to which their teaching strategies promoted students’ agency and sense of ownership of their scientific inquiry processes, and ultimately enhanced their engagement and scientific understanding.

4) Technology Integration: The participants reflected specifically on how their use of technology improved students’ engagement and learning, what unexpected challenges they encountered, and what modifications could improve their teaching.

5) Classroom and Time Management: The participants reflected on behavioral problems that prevented students from moving on to new activities. The participants also discussed time management as a critical element of effective science teaching.

2. Quality of Reflections

Most of the collaborative oral reflections (50%) were evaluated at level 2: understanding. Another 46.3% were rated level 3: reflection. Only 2% and 1% respectively were rated levels 1: Non-reflection and 4: Critical reflection.

Conclusions

This research contributes to the field of science teacher education in several ways. First, it can inform educators of what values preservice teachers have internalized about effective science teaching during their teacher preparation programs but before their field experiences, and how these manifest in their actual science teaching. Second, it identifies the areas in which preservice teachers find it difficult to improve the effectiveness of their science teaching, which can help educators decide what to address to support teachers’ development. Third, the process of articulating complex beliefs about teaching effectiveness helps preservice teachers understand the impact of their beliefs on their classroom practices (Farrell & Ives, 2015).

Lastly, given that many scholars have expressed concern about the difficulty of improving preservice teachers’ reflection skills (Körkkö et al., 2016; Ulusoy, 2016), this study introduces a new approach to reflective practices for preservice teachers, collaborative oral reflection, and sheds light on its potential for improving their reflections.

References