

# SHARING STORIES OF THE CLASSROOM USE OF METAPHORS AND ANALOGIES FOR SUSTAINING SCIENCE TEACHER LEARNING

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## PURPOSE

Typically beginning teachers sever their ties with university-based teacher educators upon graduation. As Howey and Zimpher (in Feiman-Nemser, 2001) noted: “Nowhere is the absence of a seamless continuum in teacher education more evident than in the early years of teaching” (p. 1037). Similarly, Feiman-Nemser (2001) observed: “There is no connective tissue holding things together within or across the different phases of learning to teach” (p. 1049). The need to maintain a partnership, within the context of a professional learning continuum, uniting initial teacher training, induction and continuing professional development was also recognised by beginning teachers (Department of Education, Science & Training – DEST, 2002). In this paper, the potential power of sustaining conversations between university-based science teacher educators and their recent graduates during the beginning years of their teaching careers is explored. The focus of these conversations was the teachers’ use of metaphors and analogies in science teaching. The study involved one science teacher educator (Steve) and three of his former students (Alberto, Heidi and Marianne).

## METAPHORS AND ANALOGIES IN SCIENCE TEACHING

Steve used teaching metaphors like the *teacher as provocateur* in his pre-service science education programs to help students imagine what teaching might be like from a

social constructivist perspective. As well, some students were encouraged to develop a range of personally relevant teaching metaphors that might assist them teach in ways that were consistent with their beliefs. In pre-service teacher education, Volkmann and Anderson (1998) were strong advocates for student teachers to develop metaphors for teaching. They argued that metaphors taught in pre-service programs had the potential to clarify meaning in the complex and challenging first-year that awaited graduating chemistry teachers.

Science metaphors and analogies can be effective tools to help students develop understanding of important concepts, especially those that are abstract or difficult to experience directly (Dagher, 1995). Analogies can provide a conceptual bridge between existing and targeted knowledge (Glynn, 1994), as well as evoke emotion, interest and creative insight (Duit, 1991). Visual metaphorical images portrayed in some cartoons also might help to support the relational connections between vehicle or analog and target (Cameron, 2002). However, inappropriate use of analogies can lead to the formation of alternative conceptions when teachers do not intervene (Duit, 1991). In this study the three beginning teachers interacted with and guided their students as analogies were introduced and critiqued.

#### STORYING LIVED EXPERIENCE WITHIN A COMMUNITY OF BEGINNING TEACHERS: A METHOD FOR SUSTAINING CONNECTIONS IN TEACHER LEARNING

Connelly and Clandinin (1994) argued that stories are central to teacher education because the telling and writing, retelling and rewriting of stories can lead to awakenings and to transformations in the practice of the teacher-storytellers. Telling stories of their

use of analogies in this study served a pedagogical purpose for the three teacher-participants. Through their narrative interactions with each other and Steve, the teachers constructed more sophisticated ways of acting, believing, perceiving, and evaluating classroom actions (Rex, Murnen, Hobbs, & McEachen, 2002). As Connelly and Clandinin (1994) argued, sustaining conversations with theory, research, different classroom conditions and contexts, it is possible for the teachers to create more mindful retellings of their stories.

Each of the three teacher-participants wrote a brief account of their use of metaphors and analogies during their first year of teaching. These stories were edited by Steve and returned to each storyteller for checking. All three stories were then shared between the participants for further discussion and reflection. In this way, it was hoped to establish a mini-learning community that provided a connection between the pre-service and teacher induction phases of teacher learning (Feiman-Nemser, 2001).

## FINDINGS

The stories shared between the three beginning teachers became reflective devices to help each teacher reinforce or modify his/her teaching practices. These stories are re-presented in Ritchie, Bellocchi, Poltl and Wearmouth (2005).

A common thread between the three stories was the teachers' recognition that the metaphors and analogies created common ground between teacher and student, especially in relation to shared language (or images) linking analog and target concepts. Alberto, for example, added the following account of his recent experience using analogy, largely inspired by his interactions within the learning community:

Reading Heidi and Marianne's stories reminded me of what good teaching involves. For instance, I found analogies useful in helping me to create a third space where students and I could discuss chemical concepts through a shared vocabulary. Heidi found this space with her cartoons... From reading Heidi's story I was also reminded that it is possible to assess students' understanding of a concept as a guide for further teaching...

Another significant shared experience between the teachers was the need to monitor students' use of analogies. All three teachers wisely checked student-generated analogies or extensions before whole class discussion so as to avoid the creation of alternative conceptions. Their supporting roles for student conceptual development was reinforced by Yerrick et al., (2003)

Heidi and Marianne were fortunate enough to start their teaching careers at the same school. Working together and sharing their stories of successes and failures meant that they could also learn together. As Marianne, for example, noted: "I have benefited from continued contact with Heidi as both underwent our first year of teaching. Watching Heidi's enthusiasm and success with humour and cartoons has inspired me to add this as an additional teaching strategy to my *toolbox*."

Finally, despite the obvious challenges and constraints experienced by beginning teachers, each teacher participated actively in the discussions. Their contributions not only showed the value that each teacher placed on maintaining their community, but also that the process of writing and sharing their stories provided a motivational incentive to contribute worthwhile accounts for each other's learning.

CONCLUSIONS

Teacher educators recognise that the ongoing study and improvement of one's teaching is difficult to accomplish alone (Feiman-Nemser, 2001). In this study, three beginning teachers – former classmates – shared their stories with each other and reacted to their colleagues' accounts in ways that helped each to become more reflective and implement new ideas about science analogies in their own classrooms. For example, as Alberto found, "the shared experiences of other teachers furthers my experience without having to be in their situation. I think of this as a way of shortcutting my development to achieve my teaching goals".

As Government departments around the world consider the increasing demands for better induction programs for beginning teachers (e.g., DEST, 2002), one principle for effective induction stands out from our experience in this project – "Induction programs should be negotiated on the basis of individual needs and goals, rather than standardised content, and should recognise that teachers' needs change over time" (DEST, 2002, p. 114). Because these ongoing discussions extended the participants' previous work together at university, their agenda was negotiated on the basis of individual and collective needs and goals. They shared an interest in metaphor and analogy, and through this interest they sustained further conversations about the three teachers' lived experiences applying metaphorical thinking in class over the course of their first year as science teachers.

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