

Construction of Teaching Metaphors Through the Use of Technology

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Abstract

The study of preservice teachers' development of metaphors as personal conceptions of teaching and learning is important not only to the preservice teachers but also to teacher educators. Such metaphors may provide us with snapshots, or glimpses, of our future teachers and can provide information on how we, as teacher educators, can ensure that methodological theories and pedagogical principles become a part of the preservice teachers' experiences. This study presents an important framework for the development of teaching metaphors and presents data on four preservice teachers' development through a general methods course and their subsequent teaching field methods course. Specific uses of text and graphics are examined in the data analysis. Conclusions indicate that text and selection of visuals revealed either a teacher-centered philosophy or a learner-centered philosophy of teaching.

Rationale for Metaphor Examination

The research base supports classrooms that are learner-centered where knowledge is constructed through language-mediated interaction with peers and mentors and through interaction with the environment (Vygotsky, 1979, as cited in Moll, 1990.) Thus, the articulation of the conception of teaching and learning and subsequent sharing of this conception with peers and mentors are critical components of preservice teacher education. One assignment commonly used in many teacher education programs as a method for eliciting reflection on the process of teaching and learning is the metaphor. If

a common purpose of this metaphor is to give the teacher educator an idea of what the preservice teacher is thinking about teaching and learning, the teacher educator may find a need to change instruction in order to better connect theory and practice as the metaphor develops and changes. With teacher education programs also searching for ways to effectively integrate technology to enhance teaching and learning for the preservice teacher, this study sought to determine if use of technology to construct the metaphor would enhance the preservice teachers' construction of meaning and reflectivity.

Theoretical Framework

Metaphors can serve as a coherent and succinct way of “representing and organizing thoughts about particular subject matter, activities, or theories” (Knowles, 1994, p. 60). The metaphors of prospective teachers can be used to provide “glimpses” of the developing conceptions of teaching that are held by these individuals. The metaphors of prospective teachers are determined, at least in part, by their experiences and thus reflect elements of their personal histories.

One researcher noted the process of expression actually assists in cognition:

Finding an adequate articulation for what I want to say about these matters brings them into focus. To find a description in this case is to identify a feature of the matter at hand and thereby to grasp its contour, to get a proper view of it. (Taylor, C., 1985 as cited in Wertsch, 2000 p. 27)

The act of writing text is often reflective; Lotman postulated text acts as a “thinking device” and “a generator of meaning” (1988 as cited in Wells, 2000 p. 77). If writing aids in cognition, analysis of the text should provide a glimpse into the preservice teacher's conceptualization of teaching and learning. In a study conducted by Surbeck, Han, and Moyer (1991), the researchers coded the dialogue of students' journals for

reflectivity and determined levels of reflectivity that included categories of reaction, elaboration, and contemplation based on how the students connected information back to theory. In a related study, Lamy and Goodfellow (1999) conducted a study of online students in a French course and categorized reflectivity based on whether conversations centered on French (classified as reflective) or centered on social aspects (identified as non-reflective). Thus, analysis of a teaching metaphor via PowerPoint should provide students with a mode for reflecting on the art and science of teaching and learning.

Metaphor as Means of Reflection

The use of analogies and metaphors can encourage reflection. Children's analogies and metaphors "...often push the children's thinking to new levels of sophistication and reasoning." (Gallas, 1995 p. 46) Thus, when preservice teachers develop metaphors of teaching and learning, they, like children, may examine their current views and hopefully, consider carefully the type of teachers they wish to be and become.

A case study by Knowles (1994) revealed that the experiences in the classroom as a teacher are not necessarily congruent with the metaphors that are developed based on the personal history of an individual and experiences as a student. For example, individuals may be drawn to teaching as a result of their experienced success in school and have memories of teachers whose classrooms were conducive to learning and whose actions conveyed a deep sense of care and concern for students. These personal histories may generate teaching metaphors that are not easily maintained in beginning teachers' classrooms. However, initial metaphors are likely to influence practices as these individuals enter the classroom. For this reason, Knowles suggested that examining an

individual's critical experiences might be a worthwhile task in teacher preparation courses.

The use of metaphors can enable teachers to represent their personal understanding of the teaching process, themselves as teachers, young adults as learners, and schools as systems in a way that can be beneficial in exploring the complexity of teaching (Earle, 1995). However, it is this complexity that makes the use of a single metaphor limiting in examining teacher's understanding. Furthermore, teaching metaphors may give only the perspective of the teacher and fail to acknowledge the learner's viewpoint.

Metaphor as Means of Change

One researcher insisted there should be a shift in the conceptualization of the classroom as a business to the view of the classroom as a new country to be explored, to "go where no one has gone before" as quoted in a popular television show. Wheatley (1991) indicated the "workplace metaphor was commonly used by teachers to describe the activity in classrooms and wrote, "Teachers can be heard saying, 'My students don't work hard enough'" (p. 13). Wheatley postulated a shift in the classroom metaphor from a "workplace" to a "learning place" would more closely describe a constructivist paradigm on learning. The students would be "explorers" and "inventors" rather than "workers." Wheatley described learning as a "co-construction" through social interaction in the classroom. Thus, a shift in the metaphor could encourage preservice teachers to embrace the constructivist paradigm more closely.

Bullough and Stokes (1994) examined the metaphors of 22 secondary preservice teachers enrolled in a yearlong certification program. The authors established the need

for the study by providing a rationale for metaphor analysis by examining the literature on: (a) images of self, (b) self-narratives, and (c) personal metaphors. Over this period the preservice teachers were asked to develop and refine their teaching metaphors. The researchers concluded that, initially, the preservice teachers' metaphors were similar, particularly in regard to their view of the "teacher as expert". Within the group, there were some who viewed teaching as nurturing as well. The researchers found that there were three themes that emerged from the data during the course of the study: change, loss of innocence, and rhythm. Within the group there appears to be individual differences which the researchers categorized as (a) never got it, (b) got it, but didn't like it, (c) went along, but didn't work at it, and (d) got it and used it. The researchers noted that levels of critical reflection were achieved by some of the student teachers and concluded that metaphors should continue to be explored for use in teacher education while noting that limitations exist.

Earle (1995) found that there were differences in the metaphors of novice teachers and experienced teachers. While there were apparent differences in novice teachers' metaphors they seemed to have the common attribute of focusing on managing the classroom. Experienced teachers, on the other hand, presented metaphors that focused on their approaches to instruction.

Metaphors can be used to conceptualize beliefs about the multiple roles of teachers. It has been suggested by Tobin (1990) that prospective teachers' beliefs can change significantly in the process of becoming a teacher and that metaphors can be used to examine these changes. The use of teaching metaphors along with a reflective process can help inservice and preservice teachers identify conflicts between their beliefs and

their roles as teachers. Because teachers often view themselves as having multiple roles or that they change roles according to the teaching context, teachers in Tobin's study commonly used several metaphors to describe their roles.

Metaphor as Means of Visualization

The visualization of the metaphor via the selection of pictures and graphics in the production of a PowerPoint presentation may produce a more mature conceptualization of teaching and learning. For example, Einstein visualized Maxwell's writings about light waves. He viewed himself riding on the motions of the gas molecules (John-Steiner & Meehan, 2000). The process of selecting pictures and graphics could, in fact, allow the preservice teacher to actually visualize the process of teaching and learning, much like Einstein rode the waves of the gas molecules in the development of his theory of relativity. Perhaps the visual aspects of the PowerPoint are important components in the development of the metaphor. Like a painting, the metaphor via PowerPoint might grow and develop as the preservice teachers "paint" a picture of the metaphor with the technology. In fact, if the use of PowerPoint indeed triggers the creativity of the preservice teacher, the metaphor should grow in the same way a painting grows and develops. Shahn noted: "Thus an idea rises to the surface, grows and changes as the painting grows and develops." (as cited in John-Steiner & Meehan, 2000)

Technology's Role in Metaphor Development

Can technology contribute to the process of constructing a teaching metaphor? How does the use of a media such as PowerPoint aid or inhibit the reflective conceptualization of teaching and learning? In a study of the graphing skills of 125 seventh and eighth grade students, Mokros, and Tinker (1987) concluded that use of the

technology may be a “bridge between concrete and formal operations” (p. 381). In addition, the technology provides a multi-modal approach to learning thus, addressing learning style differences in students. Other researchers also concluded the use of technology aids in cognition (Auberry & Nakhleh, 1999; Beichner, 1990; Brasell, 1987; Friedler, Nachmias, & Linn, 1990; Nakhleh & Krajcik, 1991).

In previously cited studies, research revealed technology can act as a cognitive bridge. Traditionally, the metaphor assignment used text only. However, studies by Cuban (1993) and Harper (1994) indicated analysis of photographs of classrooms provides a glimpse into the teacher’s conception of teaching and learning. Cuban (1993) and Harper (1994) analyzed photographs of classrooms for evidence of constructivist teaching principles. A classroom was described as using a constructivist approach if there was evidence of approaches such as students working in cooperative groups, a variety of materials being used, and projects displaying a variety of media.

In other studies, researchers have found that the use of the computer to mediate communication encourages reflection. Bos, Krajacik, and Patrick (1995) indicated telecommunications provided a radical means for teachers to collaboratively reflect on practice and noted that “. . . for most teachers, reflecting on their practice is a crucial step for enacting meaningful innovations” (p. 190).

Metaphors Into Practice

Rodriguez (1993) outlined the hazards of not discussing personal metaphors before practice teaching. Rodriguez supported more connection between theory and practice, and perhaps metaphors are one method to help bridge the chasm between the two. The researcher also stated that teacher education programs need to do a better job in

discovering the students' beliefs earlier in the program in order to help them find a connection between theory and practice.

Tobin (1990) found that teaching practices often correlate to teaching metaphors but in some instances a desired metaphor, such as teacher as facilitator, is not implemented in the classroom due to a variety of reasons. In other cases, teaching practices that are viewed as possibly constraining the learning process of students can be related to the teacher's metaphor. A possible use of metaphors suggested by Tobin is that teacher change can be initiated by introducing different, more appropriate, metaphors.

Bullough (1992) used teaching metaphors to examine the struggle that beginning teachers had reconciling their personal metaphors with an established curriculum. The belief that a pre-determined curriculum and personal teaching metaphors were, at least at times, contradictory was a central focus of the study. While Bullough did find that the teachers in the study struggled to negotiate the conflicting ideas between their personal metaphors and the adopted curriculum, other factors such as classroom management, were not identified as being additional sources of conflict between actual classroom teaching and theories taught in teacher education courses. The cooperating teachers were also seen as influential in reconciling the differences between metaphors and classroom teaching by allowing (or not allowing) the individual to explore the implementation of their own ideas in the curriculum.

Studies such as Bullough's serve as a reminder that the process of becoming a teacher is unique for each individual (Bullough, 1992). The personal dimensions of becoming a teacher need to be given more attention but need to be viewed within the context of classroom teaching and implementing an established curriculum.

Research Design

The research focused on how technology mediates the development of a teaching metaphor. The researchers used psycholinguistic analysis and coded data for emerging trends (Patton, 1990) and compared the themes in this study with those articulated previously in the literature. The data sources consisted of the preservice teachers' PowerPoint presentations of their metaphors. Triangulation was achieved from collecting data at two points in time and examining the text and the pictures of the PowerPoint presentations. In examining the data, the researchers looked for evidence of constructivist principles, reflectivity in the text and pictures, connections to theory, and a learner-centered focus (Surbeck, Han, & Moyer, 1991; Lamy & Goodfellow, 1999; Cuban 1993; Harper, 1994).

Data were collected from two required teacher education courses at one southeastern research institution during two consecutive semesters. The first course is a required pre teacher education course that gives an overview of the teaching profession and requires 24 hours of field placement. The second course, which many students take the subsequent semester (although not required to do so), is the content methods course and requires 90 hours of clinical experiences. With the infusion of technology in this institution's teacher education program, the course instructors implemented additional media to both of these courses, one of which was the required teaching metaphor to be developed using PowerPoint. The researchers collected the metaphors during the fall, 2001 and spring, 2002 semesters. Those students who completed the prerequisite and the methods course during two consecutive semesters determined the convenience sample. Four students were determined to have PowerPoint metaphors from both semesters and

these metaphors were examined. Few studies in metaphor analysis have examined the role of technology in metaphor change and development. Therefore, this study provides an additional method for investigating metaphors in preservice teacher education.

Results

Of the four preservice teachers, two were male and two were female. To protect anonymity, pseudonyms are used in data presentation. Additionally, in the data presentation, many of the metaphors are stated in the form of a simile, which was allowed in the assignments.

Savannah's metaphor in the pre-education class and the methods course was "teaching is like flying a kite." The metaphor was teacher directed and the PowerPoint changed minimally between the two semesters. Savannah articulated in her first metaphor "a kite must have good structure and balance, as a teacher must also have in the classroom." She re-worded this sentence in the second metaphor presentation to read, "the kite flyer must have knowledge of how to construct (sic) kite." The pictures Savannah selected to visually represent her conception of teaching and learning consisted of single clip art images such as a singular kite flying or a singular teacher teaching (Appendix A).

Butch approached his metaphor development in the pre-education class as a baseball game and also articulated a very teacher centered approach. In the second metaphor Butch developed for the methods class, he re-defined his metaphor from a coaching perspective, but maintained the political aspects of *playing the game*. For example, in Butch's first metaphor, he stated, "Teachers are just like baseball coaches in that they must motivate their students to learn each and every day." In his second

metaphor, Butch stated, “Teachers should always be in control in the classroom. Never let the students know that you feel uncomfortable. Further, he wrote: “A coach should be in control on the field. The players should never be allowed to tell the coach what type of scheme to use.” Throughout the first PowerPoint, Butch had references that teaching, much like playing baseball, should be fun. For example: “Teaching is like the game of baseball because it is a challenge, yet it is fun.” In his second metaphor, Butch appeared more serious: “As a coach, the fate of your team depends upon your preparation.” Butch did not use any pictures to illustrate his first metaphor, which might indicate that he could not visualize himself as a teacher. In the second metaphor, he selected one picture for his opening slide (Appendix A). The picture was a baseball player catching the ball which might indicate that Butch sees himself as omniscient and again very teacher centered.

William did not express a clear metaphor for the pre-education requirement, but he instead articulated his philosophy of teaching and grounded his approach with theory and briefly mentioned that teachers should be like “road maps.” In this first attempt, William stated, “Education is a process in which students gain knowledge of a subject, develop social skills, and learn problem-solving techniques.” For his second PowerPoint in the methods course, William articulated his metaphor as “Teachers are like road maps” and took a learner-centered approach. For example: “A teacher should offer a path to choose without choosing the path for the student.” He also made references that the teacher should not be the only source for information and should offer feedback throughout the learning process. William discussed that our job is to make the students life-long learners to teach them how to learn, “Teachers need to show the student how to function without a map available.” William did not have any images in his first metaphor

but in his second, used a variety from clip art to web images. In each image, a sole person was showing how to learn (teacher illustrating the map) with the exception of the map image (Appendix A). While most images appeared teacher centered, the teacher is showing how to read the map, and the text indicated support that the teacher is showing the students how to learn, or in William's words, "Teachers must also teach students how to use the MAPS effectively."

April's metaphors illustrated the most change between the first and second metaphor. In her first metaphor, April stated, "Teaching is like making stir fry" and was very teacher centered in her approach. She articulated that she was the one to decide the recipe, what ingredients to use, and how long to cook it and stated, "next, you need to chop up the ingredients just like you need to chop up the information you are going to teach your students." Further, she wrote, "All the food you have prepared should be served together." And, "All of the information you have given your students should be put together for a test." It appeared that April, in her first metaphor, also believed that testing drives the curriculum. "Eat and enjoy your finished product just like you will grade and enjoy seeing all of the information your students have learned." Images used in April's first PowerPoint did not articulate her metaphor in many cases and focused on singular items. In April's second metaphor, she re-focused and designed a new metaphor, "Teaching is like growing flowers." She stated, "Students, just like flowers, are delicate subjects. They require preparation, care, nurturing, determination, and dedication to grow in strength and knowledge." Themes relating to learning as a process, multiculturalism, and using multiple strategies were evident. In analyzing the pictures in the second metaphor, April used a picture of herself to introduce the PowerPoint, which

might indicate she views herself as a teacher. Her pictures of flowers varied from singular flowers to gardens, possibly indicating more of a student view of teaching and learning. The text supported this, such as “All flowers, like students, come in different sizes, colors, and types. This requires that teachers have multiple strategies to help all students learn.”

Discussion and Recommendations

The research base supports the use of analysis of text and photographs to reveal a glimpse into the teacher’s conceptualization of teaching and learning. However, caution must be used in drawing conclusions about the extent to which the metaphor actually represents the views of the preservice teacher on teaching and learning. The selection of clip art, for example, may have been based simply on available resources and not on how the preservice teacher views teaching and learning. In a similar manner, the text may be the result of an Internet search for teaching metaphors. Thus, the preservice teachers used little or no reflection in completing the assignment. On the other hand, this research and previous research indicates the metaphor is useful in providing some information about how the preservice teacher visualizes teaching and learning.

The questions for future research are:

1. What insights does the analysis of the metaphor offer the teacher educator into how the preservice teacher conceives teaching and learning?
2. What types of remediation activities should be considered for preservice teachers that “just don’t get it.”(Bullough & Stokes, 1994)

3. Previous research in teaching metaphors used analysis of text only. How does the selection of clip art and photographs reveal the thinking about teaching and learning?
4. In what manner does the technology act as a cognitive bridge in the development of a metaphor?

In conclusion, we found the use of PowerPoint for the production of a metaphor offered a unique view into how preservice teachers conceive teaching and learning. Both the text and selection of visuals revealed either a teacher-centered philosophy or a learner-centered philosophy of teaching. What is not clear is how closely aligned the metaphor is to the preservice teacher's conceptualization of teaching and learning. As noted by Knowles (1994), the metaphors of preservice teachers can provide a glimpse to the developing conceptions of teaching. These glimpses should not be ignored, but examined closely, in order to help teacher education programs discover students' beliefs earlier in a program find connections between theory and practice.

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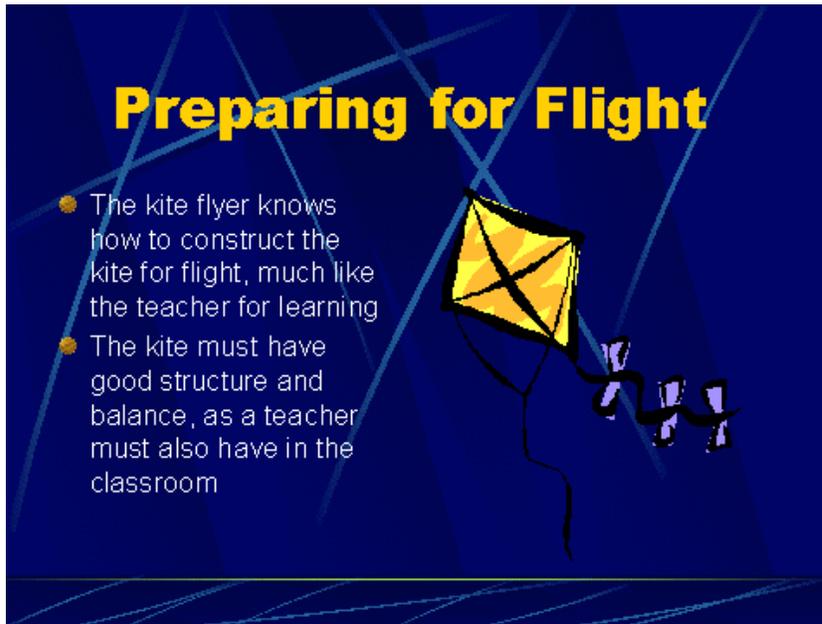
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Appendix A



Savannah's "Teaching is like flying a kite" metaphor

Teaching is like coaching
baseball



Butch “Teaching is like coaching baseball”

Teachers should Guide the Students

- * A teacher should offer students many different paths to choose from
- * A teacher should offer a path to choose without choosing the path for the student



William “Teachers are like road maps”

Teachers must also teach students how to use the MAPS effectively



- * Students must know when to consult the map
- * Students must be able to choose their own path

William and “effective MAP usage”



Miss ___' Teaching Metaphor

- Next, you need to chop up your ingredients just like you need to chop up the information you are going to teach your students.

April's first metaphor, “Teaching is like making stir fry”

Diverse Needs

- All flowers, like students, come in different sizes, colors, and types. This requires that teachers have multiple strategies to help all students learn.
- There are different techniques used with different types of flowers. I plant my Impatiens in the shade, but my Petunias can take full sunlight! My Pansies are planted in the winter; they love cold weather.

April's second metaphor, "Teaching is like growing flowers"