

Uncovering pre-service teacher beliefs about young children: A photographic elicitation methodology

Nancy Stockall

Sam Houston State University, Texas

Sara Davis

University of Arkansas Fort Smith, Arkansas

This illustrative paper provides an introduction to using mixed qualitative methods of photo-elicitation, face to face interviews and semiotic analysis to uncover pre-service students' beliefs about young children. The researchers share their experience on conducting a study using photo-elicitation and engaging pre-service teachers in a discussion about their beliefs of young children. The researchers found that the photo elicitation technique was useful in getting in-depth interview data but that the conversations about the photos actually entrenched students' current beliefs about children rather than provoking doubt or reflective practice. The researchers suggest that Pierce's semiotic theory holds promise for changing beliefs of pre-service teachers through the creation of a dialectic (ie, a context of reconciliation of opposing beliefs). While photo-elicitation provides a richness of data, dialogue is not enough to actually induce change.

Introduction

In teacher education, we have the knowledge to assess pre-service teacher's academic knowledge of teaching and learning and we instruct students to use particular pedagogical strategies such as, wait time, management routines, and concept mapping. However, we continue to grapple with the challenge of enhancing the thinking of our students. That is, changing the deeper and long term cognitive structures or beliefs required for making professional decisions that affect teaching within varying contexts and settings. Studies in social research (Ehrlinger, Gilovich & Ross, 2005; Gilovich, 1991) indicate that when people are presented with evidence related to their given belief, they are inclined to see what they expect to see. Information that is consistent with one's pre-existing beliefs is often regarded as valid and evidence that contradicts one's belief is often discounted (Joram & Gabrielle, 1998; Mansfield & Volet, 2010). In a study (Stockall & Davis, 2010) of pre-service teachers tacit beliefs about young children, some students viewed children as "little adults" and indicated a belief that children who were dressed as little adults would also act in adult like ways. These students anticipated that young preschoolers might approach science activities in a structured manner (ie, planning an experiment before engaging with materials). They were often disappointed when preschoolers began diving into the materials in an unorganised yet exploratory manner. Time and again, we (the authors) suggested to students that changing the context of the activity might lend itself better to the development of preschoolers' abilities. However for those pre-service teachers that held pre-determined notions of how children might look or act in particular situations were often impervious to the literature and research studies that we discussed in class. However, visual images or photographs appeared to hold particular strength in shaping or reifying the beliefs of pre-service teachers about young children.

This illustrative paper focuses on the use of a particular methodology, photo-elicitation and semiotic analysis, to examine beliefs or assumptions of pre-service teachers. Unlike an empirical research paper, this methodological piece examines the authors' journey to uncover pre-teachers' beliefs and how a group dialogue with students only entrenched the beliefs uncovered. The examples provided are not representative or random; rather, they are ones that we believe best illustrate the constructs presented.

Background of the study

We (authors) conducted a qualitative research study designed to uncover the nature and influence of visual signs on the belief system of pre-service teachers. Specifically we investigated the beliefs that pre-service teachers held about young children. The following questions guided our study: What beliefs do pre-service teachers hold about children? How are pre-service teachers' beliefs about children influenced by images of the child in the media, art, and/or technology? How are pre-service teachers' beliefs mediated by visual or iconic signs in the media?

Using data collected from 20 pre-service teachers in a sophomore early childhood course on Science methods, we analysed fifty-five images that pre-service teachers selected to create a photographic essay or collage of young children. Using these student selected images as an elicitation method, we asked pre-service teachers several open ended questions. The data collection process involved multiple exploratory interviews and observations of pre-service teachers dialogues related to their in-class discussions and several self-selected visual products. The unit of analysis was the candidates' responses to open ended questions related to the images of the child (their constructions of meaning) and the visual images. The questions included:

- Tell me about your product (assignment)
- How did you select your photographs for the assignment?
- What stood out for you as you selected these images?
- How do these images connect to you?
- How do you see them connecting to the larger world?
- Why do these pictures matter to you?
- How do the pictures represent your ideas about children?
- Some students have reported that their ideas about children have changed over the semester but others say their ideas have basically stayed the same. What is your take on this issue?

A qualitative, postmodern approach was employed to read the resulting images. In this approach meaning emerged from the ways in which the signs were constructed and used (Derrida 1988). In addition, we used aspects of methods of visual, social semiotic analysis (Latour 1987, Kress and van Leeuwen 1996) to analyse the images and constructivist grounded theory methodology (Charmaz 2000) to facilitate the coding of descriptive themes that emerged from the textual data. Both authors collected data of student comments from class discussions and individual interviews with the pre-service teachers. It was the unique methodology grounded in semiotic theory that we explain here.

Visual methodology

Paired with the epistemological percepts of constructivism and ethnography, visual methods and photo elicitation can be used to emphasise interpretation rather than prediction based upon quantitative measures (Brown, 1989; Wolfe, 1993). Images in visual methods can be regarded as moving across a continuum (Harper, 2002) from realist positions such as documentation (i.e. counting the number of cars in a parking lot) to illustrative examples of constructs within grounded theory (i.e. inclusion as active engagement (Stockall & Gartin, 2002), narrative positions as in storytelling using a sequence of images (i.e. photo narrative of migrant farm workers (Emmett, 1989), to a reflexive position that uses images to elicit personalised meanings (a study of inner-city children, (Clark-Ibanez, 2007). Some of the most compelling visual images in special education, such as those in Burton & Kaplan's *Christmas in purgatory* (1966) that exposed the substandard conditions of state institutions for persons with mental retardation became a catalyst for the "normalisation movement."

The technique of photo-elicitation is a strategy in visual methods that attempts to uncover trace signs or memories using self selected photographs from the participants. The use of photographs to provoke a response, was initially termed *photo-elicitation* by Harper (1984) and later by Heisley and Levy (1991). Photo elicitation is used in conjunction with face to face interviews. It is advantageous to the interview process because the images evoke past memories and experiences enhancing the interviewee responses. Visual images act as a stimulus that marks important events or meanings of the respondent. Additionally respondents tend to focus on the pictures and become more open to the interview process. The use of photo elicitation is common in sociological works but less so in educational research. For instance, photo-interviews have been used to examine: farmers' attitudes to modernisation (Gates, 1976) and a particular farming community (Schwartz 1989). Chiozzi (1989) used the technique to evaluate changes in a town, Hareven and Langenbach (1978) studied work in an American factory and Suchar and Rotenberg (1994) researched the 'meaning of shelter adequacy' associated with housing in an American neighborhood. Photo-elicitation has also been used across other disciplines and topic areas in order to enhance memory retrieval (Aschermann et al. 1998), to interview young children/school students (Diamond 1996, Foster et al. 1999, Salmon 2001) and in program evaluations (Tucker and Dempsey 1991, Buchanan 1998).

Research on changing teacher beliefs

Early childhood pre-service students bring beliefs about children with them into the teacher education program. The beliefs they bring with them are highly resistant to change and tend to remain the same over time (Kagan, 1992; Lortie, 2002; Richardson, 1996). Making beliefs explicit is thought to be one way to impact pre-service students learning. Examining one's beliefs enables us to have a greater sense of efficacy (Lortie, 2002; van manen, 1991). "Teacher belief is a particularly provocative form of personal knowledge that is generally defined as pre- or inservice teachers' implicit assumptions about students, learning, the classroom, and the subject matter to be taught (Kagan, 1992, p. 65).

A number of research studies indicate that pre-service teacher beliefs are often stable and impervious to change. In a study conducted by Zeichner, Tabachnick and Desmore (1987), students were asked to solve 18 classroom dilemmas and justify their solutions. The researchers analysed the interviews and observational data collected to infer the particular style of the students' problem solving. Rather than modifying or changing their beliefs, the process actually tended to solidify the pre-service teachers' assumptions. In another study, (McIntyre & Kyle, 2006), researchers found that a school reform policy for educating young children had little effect upon teacher change 10 years after the study and that those teachers who made the most progressive changes were those who already believed in the theoretical basis of the policy. Similarly, in a study conducted with new teachers during the first two years of their careers (Flores, 2005), the author found that most teachers reverted to a teacher oriented and traditional centered approach in teaching rather than the student centered approach supported by the teacher education program. There is evidence that some teacher candidates are influenced by professional dialogue (Graham, 2005) through self-reporting. Whether the candidates actually employed these ideas in future classroom practice was not addressed in the study. On a similar note, Korthagen (1999) concluded from his study of teacher candidates, that some students entered the program with a reflective type of learning whereas others were more likely to learn through an external perspective such as conforming to a group or authoritative opinion. Teacher educators who were themselves, reflective or internally directed learners, only connected with their students with the same orientation. After the first year, many of the students with external orientations dropped out or simulated a change in orientation.

One hypothesis related to the entrenchment of teacher candidates' belief systems is that teacher candidates lack the practical knowledge or teaching experience to become more reflective (Richardson, 1996). Other researchers suggest that teachers' beliefs and assumptions can undergo change when actually engaged in teaching and through a context of interaction with expert teachers (Penlington, 2008, Fiumara, 1990). Teacher research into the beliefs held by pre-service teachers covers a wide array of foci. Many studies look at what pre-service teachers believe about curriculum (Brown, 2005; Charalambous, Panaoura & Philippou, 2009) and teaching (Buehl & Fives, 2009; Isikoglu, 2008; Tanase & Wang, 2010). Studies have used many different methods for eliciting students' beliefs ranging from self-reporting on surveys to the analysis of metaphors (Isikoglu, 2008; Farrell, 2006). A few studies have looked at the beliefs teachers hold of the learner in terms of diversity (Rosenfeld & Rosenfeld, 2008), but there is a scarcity of studies that attempt to uncover tacit beliefs about the child. One of our assumptions in this study was that the child is a cultural invention. Early childhood pre-service teachers bring certain concepts about children with them that have been internalised through their experiences in society and culture (Hill, Stremmel, & Fu, 2005). We theorised that we could increase our students' awareness of their own beliefs about children by focusing on the images of children that they are most familiar with. By having them choose the photos they wanted to discuss we drew on their tacit beliefs.

In our own teaching experiences, teacher candidates readily admit to limitations in their knowledge of bridge building, sculpting and building computers. However, when we ask about their knowledge of teaching they confidently rate themselves as high on

their knowledge of the teaching and learning process because “we have all been in school for years and so have our parents.” They contend that they know about education because they have been there. Thus, many of their beliefs about teaching are informed by their own personal experiences. Some students reason that to reflect on the process of teaching is meaningless because they already know what they know. That is not to say, our students fail to learn management procedures, pedagogy or curriculum content. Our teacher licensure test scores indicate significantly positive gains in content knowledge. Yet, many of the beliefs that our candidates hold, specifically those about the nature and image of the child remain firmly entrenched in their thinking. Some of these beliefs such as those mentioned earlier, often limit pre-service and novice teachers in their decisions to use the best strategy, methodology or contextual environments that enhance the learning of individual children.

Theoretical framework

What is it about a belief that makes it so resistant to change? Our initial quest to unravel the nature of teacher candidates’ beliefs, how they are constructed, sustained and ultimately changed, began with the work of Herbert Blumer (1969) who introduced the perspective and methodology of symbolic interactionism. From this perspective teachers “act towards things on the basis of the meaning that these things have for them” (Blumer, 1969, p. 51). Such things include everything that the teacher may note in his/her world-physical objects, events, cultural ideals, routines, rituals, people, classrooms, curriculum, activities, as well as his/her own thoughts. Symbolic interactionism proposes that the use of meanings by a person involves an interpretive process (Blumer, 1969). Accordingly the interpretive process is a formative one in which meanings are consistently revised, reinforced, deconstructed and recreated to guide action. This premise is congruent with Penlington’s (2008) notion of practical reasoning, in which the teacher candidate must engage in an interactive dialogue with teachers in order to uncover the hidden assumptions that guide practice. Penlington describes the teacher to teacher dialogue as necessary for generating “otherness”:

One way of defining dialogue is to contrast it with monologue: whereas a monologue is an expression of ideas from one perspective only, a dialogue must encapsulate at least two points of view, such as that expressed by the questioner versus the responder, or the speaker versus the listener (Fiumara, 1990; Goffman, 1983). A dialogue between two people, then, is a form of communication that requires participants to mediate between more than one perspective: a self-perspective and an other-perspective (p. 1307).

We can further differentiate the nature and emergence of rational thought from a semiotic perspective, specifically that of Charles S. Peirce. For Peirce the world is made up of signs and a sign entails three components that enter into an interrelated and interdependent relationship. The first element is the representamen (something that represents something else). The second element of the sign is the semiotic object, which is the concept that the representamen encodes. Finally the interpretant, the third element of the sign, is its meaning. The interpretant brings the representamen and the semiotic object into a relationship with itself interrelating with them to become a full

fledged sign (Merrell, 1995). Thus, people generate signs in their everyday experiences that evolve through a triadic process of emerging signs, signs that are connected, and finally to the fully developed sign which is embodied with meaning.

To illustrate, a representamen can be a photographic image of a child. The actual child photographed in a studio becomes the semiotic object and the interpretant or meaning that arises from someone's past experiences, may be the admiration of youth, innocence, or beauty signified through the social distance of the viewer. The child is shown in full but without much space around her. She is within the viewer's reach but far enough away to avoid interaction. The meaning or richness all emerges from the single image of the child. However, such examples tend to simplify the complexity of semiosis as any of the elements can become any of the other two components under different circumstances. For instance, the semiotic object, the child, as a social class of people, can become a representamen whose semiotic object is her expensive clothes. The interpretant, a meditative interrelationship between the clothes and the child becomes envy or desire of the wealth bestowed upon her. In another example, the memory of looking at one's own child (a trace sign) consisting of an image of the child who represents a lost loved one (semiotic object) engenders confidence (interpretant) at having overcome painful experiences. With all three components the sign comes into existence and continues to interrelate with other signs providing a deeper, richer yet changing schematic image of who one is in relationship to his or her semiotic world.

Peirce's categories of thought help us understand how a particular sign evolves in a process that generates meaning. As we can see from the examples above, the form of the sign such as the child's portrait can represent different experiences (ie thoughts, events, memories, texts) for different individuals but each individual sign is generated and evolves through the semiotic process to become a different or more complex sign. Thus meanings arise from the semiotic process of sign generation evolving into structures or rules that guide behavior within different contexts. If we want to understand the beliefs of pre-service teachers about children then Peirce's theory of thought signs can help explain the gradual process of sign signification and meaning. Simply put, it allows us to uncover the process of constructing beliefs.

Pierce's categories of thought

To understand Pierce's three categories of thought (*firstness*, *secondness* and *thirdness*), it is necessary to understand the underlying triadic structure of Peirce's philosophy of semiotics. First, Pierce indicated that everything is a sign. That is, all experience, thought, action, objects, and humankind is a sign. Therefore, firstness of thought is actually a sign. When one experiences firstness of thought, it is just a sense that something exists or a potential for an idea. Firstness is a felt presence of some thing; an unconscious quality that has potential to move into existence. Firstness is transitory or ephemeral and is the first move within a process of meaning making called semiosis. From firstness, one moves into secondness of thought bringing with it the sense of some thing into relationship with an ability to question and analyse. Finally in thirdness, one brings the former processes into relationship with the third; an ability to infer, evaluate and interpret. These levels of thought are universal and must

be evoked by contextual factors or multiple signs in order to fully evolve. The evolution of thought is context dependent and requires other signs to provoke and drive the process of sign signification or meaning making. To study teacher beliefs requires that we not only examine the signs and sign process, but also the context of the situation that presses upon, evolves into and moves other signs to create a fracture in the system. That fracture is doubt. Curiosity provokes that sense of firstness towards secondness but what does it take to promote thirdness? We believed that combining the qualitative interview with participant selected images would provoke a rich dialogue among the researchers and participants thus constructing a context of doubt from multiple perspectives.

Thus, it made sense to us as researchers to pair the qualitative interviewing with photo-elicitation to gain an insider view of the participants' beliefs about young children. If photo-elicitation would evoke more dialogue then our data collection would be richer than that of an interview. Similarly, if the participants self-selected the photographs then the meanings participants' constructed would be more personal than if we (the researchers) pre-selected the images. Finally, the dialogue among participants would stimulate reflective thought and compel students to move forward in their thinking to a new level of Thirdness. Unfortunately we found little research on the use of visual semiotics in to analyse change in teacher beliefs. What is available focuses on pre-service teachers' belief systems and how their conceptualisations of teaching as a profession are depicted in their personal drawings (Katic, 2008).

In our study, visual semiotics refers to the use of visual images, specifically pre-service teachers self selected photographs of young children. Visual semiotics examines how a visual image is used and how the negotiation of meaning evolves in a complex social process. Meanings evoked by visual images require the image itself, a producer, the interpretations of an audience and the context in which it is viewed (Sturken & Cartwright, 2001). By examining the way in which meaning is co-constructed with visual images, we believed the method would uncover ways that students construct their beliefs about children and how that related to their construction of teaching practices. We recognised that visual images are not transparent nor are they representation of truth or reality. They are constructed by producers and placed into relationships with their objects by viewers. All this occurs within a context designed to reign in the potentiality of meanings. When the producer of the image engages in a conversation with the researcher and other participants the dialogue delimits the potential of later interpretations. The class discussions among participants about their photos created and marked different signs whereby meanings evolved from sign signification. Moreover, signs are the foundation and substance of thought.

Just as there are three categories of thought, (firstness, secondness, and thirdness), Pierce created a triadic taxonomy of signs. The fundamental levels of signs are iconic, indexical, and symbol. Iconic signs depict some quality of the semiotic object. The photograph of a child shares a quality of the object and is therefore, an iconic sign. An indexical sign has a relationship between the sign and it's object. A child's toy or dress indicates the existence of the child is therefore an indexical sign. The symbol has a relationship to the semiotic object and its interpretation. Thus, the word 'child' is a

symbol for a developmental stage of human; the child. The triadic system of reasoning or thought signs is interrelated with the individual development of a sign. While photographs are a permanent data source that can be revisited multiple times, Pierce explained that a sign is never the same sign. Thus a methodology that employs repeated rather than single viewings within several conversations would appear to promote changes in thinking as others share their perspectives. In fact, our conversations did reveal particular thoughts signs for different students. We were careful to set up an open ended condition for the pre-service teachers to self-select the images for analysis. The second author simply directed students to “find and collect images of young children.” Without further contextual clues, students began searching on the internet coming across various types of iconic images of the child. However, they only had a sense of what the image was to look like and their thought process was at the level of what Pierce called “Firstness”. Firstness is the beginning of a sign. Pierce called the act of relating objects (the image of a child is similar to an actual child) as Secondness or the second level of thought. For some students, the task of pinpointing a sign was simple because the photograph of a child was instantly put in relationship to an actual child (Secondness), “I just looked for photos of children” or “I found some photos of my brothers when they were young”. Yet, for others, confusion set in with anxiety; “I didn’t know what kind of images she (ie. second author) wanted. It (the assignment) wasn’t real clear.” Only when the students entrenched in the level of Firstness took action by beginning the search for images did they move towards Secondness of thought. In Secondness the students began to see the images as having potential meaning, “Oh I just randomly selected some pictures. This one (a child in the street) because I like Italy.” and at the level of Thirdness (fully fledged meaning), they responded with comments such as, “I picked these pictures because the children looked happy.” Or “She was just so cute and sweet” and “The children here are just having fun...getting their fun out before going to school.” Two thought signs together, the iconic sign and the interpretant, gave way to the richness of Thirdness with all its cultural content as a thought sign of a child as innocent, playful and free.

After further questioning the pre-service teachers in our study, the images evoked stronger and more complex meaning for the students. This is consistent with Pierce’s premise that Thirdness of thought continues to evolve and can at any time become Firstness or Secondness depending upon one’s semiotic world. One thought sign engenders new signs that reconfigure the semiotic world itself and one’s self in it. For example, several images included formal portraits of young children, some as a single shot and others in family portraits. When asked “what stood out for you in this photo?” one student responded, “She’s so cute, the way she is sitting so nicely and smiling.” The portrait with the absence of color and only the brightness values remaining evoked a sense reality or truth value in the photograph. Blurred details and lighting techniques set the child in a numinous state but also gave the image a kind of “photorealism” (Kress & Van Leeuwen, 1996); this is a real child. The child remained still, posed, ready to be captured by the viewer and looked upon as a miniature adult; controlled, dignified, and objectified. The pre-service teachers who selected portrait views of families included ones that depicted the nuclear family with two parents (male and female) and one to three children. In these illustrations we noted the composition of the participants representing the social power structure of the family with both parents at

similar heights and children seated in a superordinate position below them (Figures 1 and 2). The color was also restricted to a particular palette with darker colors used to outline or highlight those with dominant social power. However none of our students questioned the polished nature of the photographs or that they might have been scripted to draw in the viewer to delimit the meaning of the image.



Figure 1: Family portrait



Figure 2: Family group portrait

Similar images of children in “glamour photos” exhibiting make-up, professional hair styling and designer clothes evoked pre-service teachers to exclaim over the cuteness or cultural beauty of the child; a projection of what the pre-service student believed to be the embodiment of herself or possibly a child of her own. The child was viewed as a “little adult” with connotations of cleanliness, health, and beauty. Additionally the child image signified high social status, wealth and success. The child was viewed as property and signified the accomplished family of wealth and status. In the portrait and glamour photos the image participants exemplify a “demand” image (Halliday, 1985). That is, the children look directly at the viewer almost demanding a response. The image participants force the viewer to engage with them to respond to a “goods and services” demand. These are the clothes that make one ‘cool’ or sophisticated. It is the look of the young adult with accessories to match (Figure 3). Again, the participants viewed these images as more like them than not like them.

Pre-service teachers also selected several images that captured an adult and a child (presumably the parent) interacting together. Unlike the portrait views, the image participants in these particular photos do not look out at the viewer; rather their role suggests that they are not aware of being viewed and that the viewer is an invisible onlooker. The image participants are viewed as objects of contemplation and eye contact only takes place between the image participants. Thus the image participants are presented as items of information. Several pre-service teachers commented that they selected these because the “parent was involved with the child”. The close proximity of the participants (Figures 4 and 5) and their smiling gaze at each other

connote familial connection. The image participants are viewed as the idealised iconic signs of unconditional love and acceptance. It is interesting to note that the children in these images are all very responsive. The child responds almost effortlessly to the smiling gesture of the adult. The images evoked a sense of familial attachment and reified the participant's beliefs about the middle class family.



Figure 3: Little adults



Figures 4: Responsive to adult



Figure 5: Familial connections

For other students, images of children contained both males and females actively interacting in outdoor settings. One student commented that she liked the photo of children playing on the beach because they are having fun, they are active and playing. For these pre-service teachers children are viewed as active participants and full of energy, physically healthy and playful (Figure 6).



Figure 6: Active play outdoors

Finally, another group of photos were selected on the basis that they represented “diversity.” Several pre-service teachers remarked, “I tried to find some pictures that showed diversity.” It was interesting to note that diversity was represented through three key attributes of race, disability and culture. In most of the selected images showing diversity, as defined by the pre-service teachers, the image participants did not address the viewer but were presented as an idea to acknowledge; to consider. In two of the images, the size of the frame is indicative of social distance. We can see the whole of the classroom and the image draws us to the young girl illuminated by the lighting while those in the back of the image lack detail (Figure 7). Viewers look upon the children from a social distance and no attempt is made to create engagement between the viewer and the participant. Similarly, the child using the walker is clearly visible at a distance so that we view all of her including her walker but she remains set apart as an object to be analysed. She is “looked at” but not invited nor engaged with the viewer (Figure 8).

While our analysis of the images contained a critical eye for the way in which the photograph was captured, our student participants focused on the image as an indexical sign of the “idealised child”. The photographs of a single child depicted more

“otherness” and distance (“She’s handicapped but can still do things on her own” or “The picture shows a different culture”). Family photographs suggested that children belong, are attached and protected by others in power (“I like this because it shows how the family is together”). Images that contained activity among children signified freedom and playfulness (“they are getting their energy out before school starts”) whereas; others signified obedience and compliance (“It reminded me of my brother and me playing together. Sometimes we got along and had fun together”).



Figure 7: Cultural diversity



Figure 8: Social distance

The dialogic

It was interesting that none of the pre-service teachers considered the perspective of the photos or acknowledged how the images situated the image participants. The level of Thirdness was constrained by the pre-service teacher’s inexperience at analysing the

images. They became captive audiences of the images and appeared easily manipulated by the cultural icons of the Western world. While diversity was acknowledged, it did not appear to be integrated. Rather those of a diverse background or minority status remained as objects for contemplation and within the realm of 'other'. Thus, for some pre-service teachers, children were viewed as incomplete not by their own means but certainly in need of a benevolent benefactor. As one student remarked on figure 8, "Here you can see that now she is trying it on her own...and she's happy."

As students heard the ideas of others in the group, they also began to make similar comments such as "the children are happy, and playful. They are in nature, having fun and laughing." The meanings became more entrenched as students listened to each others' meanings and beliefs. When asked to confirm that they viewed the child as 'item of beauty', innocence, a grown up little girl and or belonging to the family they responded with confidence in their affirmations. Viewing the child as an object of desire or as property was deemed valuable and consistent with their experiences. Children as little adults who could be controlled and refined was a perspective commensurate with the pre-service students cultural background and influence of predominately Caucasian and protestant ethic. The child image was the center object of the family signifying home, faith and social class.

Contextual limitations of semiotic potentiality

While the potential for multiple sign interpretants is unlimited, it is the negotiated text that holds stability for the self. In a very general sense, the text, that is the set of organised thoughts, behaviors, impressions, and actions are negotiated among people in a social group. The text evolves from a dialogue among and between interpretants. At the most basic level learners express, reconstruct, and organise content into meaningful texts through conversation or dialogue. The dialogue can be an internal conversation within the individual, an internal one between author and written text or an external dialogue among students in a classroom discussion. Yet a dialogue is not sufficient for generating reflectivity or practical reasoning. For in a dialogue the interpretant may seek to mark and organise trace signs of past experiences, information from other authors or like-minded students that support his/her existing beliefs. While this provides stability for the emerging sign because dissonance is temporarily avoided, the complexity of the thought sign remains restricted. Whereas, we believed that the pre-service teachers would come to change their beliefs within the context of conversations with others, we found just the opposite. A conversation or dialogue was not sufficient for deepening the thought process of the students. Rather it contributed to students' deepening of beliefs based upon the signs and meanings constructed by others viewing the photographs in a group discussion.

These observations lead us back to semiotic theory to understand how the context of the classroom interacts with sign or meaning making. According to Pierce (1991), it is a dialectic rather than a conversation or discussion with students that is necessary to construct a context that presses the student's thought process. Within a dialectic, that is, the reconciliatory process of opposing beliefs (Colapietro, 1993) the potential for new self knowledge is greatly enhanced. The dialectic creates a (con)text that limits the

sphere of potential interpretants (Eco, 1990). The differentiation process of Secondness allows for the marking of one sign over another. Those signs that contribute to the logic and coherence of the text bring about a final logical interpretant (Eco, 1990). In other words, creating a context where teacher candidates can inquire about the logic or reasoning of their conceptions of the child against the reasoning of others creates another layer of meaning to the symbol or concept of child. The mutual negotiation within the dialectic creates boundaries or a context that evokes new knowledge and substantiates Firstness, or it can give one's working abductions tenuous stability towards becoming a symbol. In order for the dialectic to create a context for bringing about a logical interpretant participants must engage in reflectivity. For without it, habit takes precedence.

But as we have seen in several studies, the dialogue that occurs among student candidates or between candidates and mentor teachers does not always mean that beliefs are changed but in some cases the beliefs become more entrenched. It is not enough to engage in a dialogue with others, but to enter into dialectic.

Discussion

The significance of this illustrative paper is directly tied to the notion of practical reasoning, in which the teacher candidate must engage in an interactive dialogue with teachers in order to uncover the hidden assumptions that guide practice (Penlington, 2008). Pierce's triadic system of signs helps teacher educators uncover the mediated thinking of pre-service teachers. Teacher educators must investigate how pre-service teacher's beliefs are mediated through multiple lenses such as the cultural media, their own past experience with children or their own experience as a child. Once these hidden assumptions are revealed, teacher educators can construct contexts to cast doubt upon these assumptions. In this case, we experienced how pre-service teachers can become enmeshed in the level of Firstness of thought when the given task is not clearly understood nor conceptualised. At this level students tend to respond in several different ways. Some resist the open nature of the teacher's question or assignment and demand more details to the problem, others dive into the task testing their choices and creating meaning about their selections while still others become paralysed waiting to see what others do in the class. When students actually begin to work towards the task (finding images of children) or conceptualising a problem they move towards the level of Secondness where the images begin to represent something. Thirdness evolves when connections are made with others' assumptions, attributing past trace signs to the object at hand, or when confronted by contrary assumptions or beliefs.

And while teacher educators can create contexts for dialogue to reveal pre-service teacher's beliefs, simply conversing in a dialogue does not necessitate a change in beliefs. Pierce & Hoopes(1991) regarded doubt as the signifier or potential for change in belief. If there is no opportunity to instill doubt, the belief continues and provides a comfortable and satisfactory state. People are compelled to remain in this steady state and often take every opportunity to collect data that supports their beliefs. If pre-service teachers view children as "little adults" and see no reason to question this belief, how will they engage in developmentally appropriate practices? To educate pre-

service teachers, we must be able to help them uncover their current beliefs about children and provide opportunities to engage them in experiences that introduce a sense of doubt in those beliefs. In so doing, we hope to discover ways in which teacher educators can influence the particular dispositions of pre-service teachers to better fit the needs and development of young children.

Summary

In this illustrative methodological paper, we examine visual methods describing the technique of photo-elicitation combined with Pierce's semiotic analysis of thought. It is the combination of these tools that allow for the uncovering of teacher belief systems and suggest ways in which these beliefs can change through the process of a dialectic. Both doubt and belief have positive effects on us. Beliefs allow us to perform efficiently from habit whenever an appropriate occasion presents itself. Doubt stimulates us to action until it is destroyed. Pierce identified the struggle to attain a state of belief by ridding the irritation of doubt as inquiry (1991). However, it is the context of interaction that prompts the irritation of doubt. That is, a dialectic or a negotiation of opposing beliefs soothes the irritation of doubt and provides for a new belief. However, given semiotic theory we know that beliefs contain signs that are mediated by experiences and inquiries.

First as teacher educators, we must be able to understand pre-service teachers' beliefs and assumptions about young children. Once these are revealed, a dialectic context of interaction must be created to cast doubt on those beliefs. In our study, we discovered that self selected photographs evoked more in depth discussions about the meaning of the young child, but the discussions only served to entrench students' beliefs. Pierce's semiotic theory holds promise by explaining the way in which signs can be marked to sustain one's belief. Additionally, it is only within a context of doubt that we create the conditions for a reconstruction of beliefs. Setting up a context of inquiry evokes the interrelationships of signs that produce meaning which in turn provides a new belief that satisfies one's desires. Once a belief is created, only another inquiry will shake it loose. It is this constant introduction of doubt that the teacher educator must sustain in the education of teacher candidates that gives birth to true reflective practice.

References

- Aschermann, E. et al. (1998). Photographs as retrieval cues for children. *Applied Cognitive Psychology*, 12, 55-66.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Berkeley, University of California Press.
- Brown, E. T. (2005). The influence of teachers' efficacy and beliefs regarding mathematics instruction in the early childhood classroom. *Journal of Early Childhood Teacher Education*, 26(3), 239-257.
- Buchanan, D. (1998). Representing process: The contribution of a re-engineering frame. *International Journal of Operations and Production Management*, 18(11/12), 1163-1182.

- Buehl, M.M. & Fives, H. (2009). Exploring teacher's beliefs about teaching knowledge: Where does it come from? Does it change? *The Journal of Experimental Education*, 77(4), 367-407.
- Burton, B. & Kaplan, F. (1974). *Christmas in Purgatory: A photographic essay on mental retardation*. Syracuse, N. Y.: Human Policy Press.
- Charalambous, C. Y., Panaoura, A. & Philippou, G. (2009). Using the history of mathematics to induce changes in preservice teachers' beliefs and attitudes: Insights from evaluation a teacher education program. *Educational Studies in Math*, 71, 161-180.
- Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 509-535). Thousand Oaks, CA: Sage.
- Chiozzi, P. (1989). Photography and anthropological research: Three case studies. In F. Boonzaier (Ed.), *Eyes across the water*. pp. 43-50. Amsterdam: Het Spinhuis.
- Clark-Ibanez, M. (2007). Inner city children in sharper focus: Sociology of childhood and photo elicitation interviews. In G. C. Stanczak (Ed.), *Visual research methods: Image, society and representation* (pp. 167-196). Los Angeles: Sage.
- Colapietro, V. M. (1993). *Glossary of semiotics*. New York, Paragon House.
- Derrida, J. (1988). *Limited Inc*. Ed. Graff. Evanston, IL: Northwestern UP.
- Diamond, K. E. (1996). Preschool children's conceptions of disabilities: The salience of disability in children's ideas about others. *Topics in Early Childhood Special Education*, 16(4), 458-475.
- Eco, U. (1990). *The limits of interpretation*. Bloomington, Indiana: University Press.
- Ehrlinger, J., Gilovich, T., & Ross, L. (2005). Peering into the bias blindspot: People's assessments of bias in themselves and others. *Personality and Social Psychology Bulletin*, 31, 680-692.
- Emmett, H. L. (1989). *Fruit tramps: A family of migrant farmworkers*. Albuquerque: University of New Mexico Press.
- Fiumara, G. C. (1990). *The other side of language: A philosophy of listening*. London: Routledge.
- Farrell, T. S. C. (2006). 'The teacher is an octopus': Uncovering preservice English language teachers' prior beliefs through metaphor analysis. *RELC Journal: A Journal of Language Teaching and Research*, 37(2). 236-248.
<http://dx.doi.org/10.1177/0033688206067430>
- Flores, Maria A. (2005). Mapping new teacher change: Findings from a two-year study. *Teacher Development*, 9(3), 389-412.
- Foster, S., Hoge, J. D. & Rosch, R. H. (1999). Thinking aloud about history: Children's and adolescents' responses to historical photographs. *Theory and Research in Social Education*, 27(2), 179-214.
- Gates, M. (1976). Measuring peasant attitudes to modernisation: A projective method. *Current Anthropology*, 17(4), 641-665.
- Gilovich, T. (1991). *How we know what isn't so: The fallibility of human reason in everyday life*. New York: The Free Press.
- Goffman, E. (1983). *Forms of talk*. Philadelphia: University of Pennsylvania Press.
- Graham, P. (2005). Classroom-Based assessment: Changing knowledge and practice through preservice teacher education. *Teaching and Teacher Education*, 21(6), 607-621.

- Halliday, M. A. K. (1985). *An introduction to functional grammar*. London: Edward Arnold.
- Hareven, T., & Langenbach, R. (1978). *Amoskeag: Life and work in an American factory city*. NY: Pantheon Press.
- Harper, D. (1984). Meaning and work: A study in photo-elicitation. *International Journal of Visual Photography*, 2, 20-43.
- Heisley, D. D. & Levy, S. J. (1991). Autodriving: A photoelicitation technique. *Journal of Consumer Research*, 18, 257-272.
- Hill, L. T., Stremmel, A. J. & Fu, V. R. (2005). *Teaching as inquiry: Rethinking curriculum in early childhood education*. Pearson.
- Isikoglu, N. (2008). The effects of a teaching methods course on early childhood preservice teachers' beliefs. *Journal of Early Childhood Teacher Education* 29(3), 190-203.
- Joram, E. & Gabriele, A. (1998). Preservice teacher's prior beliefs: Transforming obstacles into opportunities. *Teaching and Teacher Education*, 14(2), 175-191.
- Katic, E. K. (2008). From frontrunners, to paper dolls, to fiends: Semiotic analyses of premeditated teacher images. *Semiotica*, 2008(172), 65-95.
<http://dx.doi.org/10.1515/SEMI.2008.090>
- Kagan, D. M. (1992). Implications of research on teacher belief. *Educational Psychologist* 27(1), 65-90.
- Korthagen, F. (1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational Researcher*, 28, 4-17.
- Kress, G. & Van Leeuwen, T. (1996). *Reading images: The grammar of visual design*. NY: Routledge Press
- Latour, B. (1987). *Science in action*. Cambridge MA: Harvard University Press.
- Lortie, D. C. (2002). *Schoolteacher: A sociological study*. University of Chicago (2nd ed.).
- Mansfield, C. F. & Volet, S. E. (2010). Developing beliefs about classroom motivation: Journeys of preservice teachers. *Teaching and Teacher Education*, 26(7), 1404-1415. <http://dx.doi.org/10.1016/j.tate.2010.04.005>
- McIntyre, E., & Kyle, D. W. (2006). The success and failure of one mandated reform for young children. *Teaching and Teacher Education*, 22, 1130-1144.
- Merrell, F. (1995). *Peirce's semiotics now*. Toronto, ON, Canadian Scholars Press.
- Peirce, C. S. & Hoopes, J. (1991). *Peirce on signs: Writings on semiotic*. Chapel Hill, University of North Carolina Press.
- Penlington, C. (2008). Dialogue as a catalyst for teacher change: A conceptual analysis. *Teaching and Teacher Education*, 24, 1304-1316.
- Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sikula (Ed), *Handbook of research on teacher education*. New York, Macmillan: 102-119.
- Rosenfeld, M. & Rosenfeld, S. (2008). Developing teachers' beliefs about learners: The role of sensitizing teachers to individual learning differences. *Educational Psychology*, 28(3), 245-272.
- Salmon, K. (2001) Remembering and reporting by children: The influence of cues and props. *Clinical Psychology Review*, 21(2), 267-300.
- Suchar, C. S. & Rotenberg, R. (1994) Judging the adequacy of shelter: A case from Lincoln Park. *Journal of Architectural and Planning Research*, 11(2), 149-165.

- Stockall, N. & Davis, S. (2010). Images of the child: Unraveling the meanings of pre-service teacher beliefs about children. Paper presented at the meeting of the American Educational Research Association, April. Denver, CO.
- Stockall, N., & Gartin, B. (2002). The nature of inclusion in a Blue Ribbon School: A revelatory case. *Exceptionality*, 10(3), 171-188.
- Sturken, M. & Cartwright, L. (2001). *Practices of looking: An introduction to visual culture*. Oxford: Oxford University Press.
- Schwartz, D. (1989) Visual ethnography: Using photography in qualitative research. *Qualitative Sociology*, 12(2), 119-154.
- Tanase, M., & Wang, J. (2010). Initial epistemological beliefs transformation in one teacher education classroom: Case study of four preservice teachers. *Teaching & Teacher Education*, 26(6), 1238-1248.
- Tucker, S. A. & Dempsey, J. V. (1991) Photo-interviewing: A tool for evaluating technological innovations. *Evaluation Review*, 15(5), 639-654.
- van Manen, M. (1991). *The tact of teaching: the meaning of pedagogical thoughtfulness*. SUNY Press.
- Wolfe, A. (1993). *The human difference: Animals, computers, and the necessity of social science*. Berkeley: University of California Press.
- Zeichner, K. M., Tabachnick, B. R. & Densmore, K. (1987). Individual, institutional, and cultural influences of the development of teachers' craft knowledge. In J. Calderhead, (Ed.), *Exploring teachers' thinking*. London: Cassell Education.

Nancy Stockall, is an Associate Professor of Special Education at Sam Houston State University. Her research using an applied semiotic approach to inclusion has been published nationally and internationally.

Email: nxs016@shsu.edu

Sara McCormick Davis, is an Associate Professor of Early Childhood Teacher Education at the University of Arkansas Fort Smith. Her research interests include pre-service early childhood teachers' construction of knowledge about teaching.

Email: sdavis@uafortsmith.edu