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# The Potential of Photo-Talks to Reveal the Development of Scientific Discourses

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This study explores the potential of a photo-elicitation technique, photo-talks (Serriere, 2010), for understanding how young girls understand, employ and translate new scientific discourses. Over the course of a nine week period, 24 kindergarten girls in an urban girls' academy were observed, videotaped, photographed and interviewed while they were immersed into scientific discourse. This paper explicitly describes how their emerging discursive patterns were made visible through this methodological tool. The findings are presented in vignettes in three themes uncovered during our analysis which are the following: *Presented the recollection of the scientific Discourse, Described the understanding of scientific Discourse*, and *Created an opportunity for the translation into everyday discourse.* Science educators can benefit from this methodological tool as a reflective tool with their participants, to validate and/or complicate data. Additionally, this methodological tool serves to make discourse patterns more visible by providing a visual backdrop to the conversations thus revealing the development as it is occurring in young children.

*Keywords*: Photo-Elicitation; Photo-Talk; Science Education; Early Childhood Education

## Introduction

"The butterfly is in the chrysalis stage!" Victory exclaimed during a photo-talks conversation as she pointed to a digital photograph of herself looking at the brown chrysalis in the jar on the lab bench, "It was an egg then it formed its chrysalis or pupa and then it will become a butterfly". When asked how she would describe this to her friends she remarked, "It is like when you go into the dressing room and put on a church dress-you act like someone different". In this example, Victory, a kindergartener in an all-girls urban public school, translated the scientific language taught to her into her own language through the use of an innovative photo-elicitation tool, photo-talks (Serriere, 2010). This tool provided a reflective moment in a democratic and non-threatening way while providing a visual backdrop of digital photographs taken during science lessons. We posit this tool helped Victory to integrate her new scientific discourses.

This opportunity to discuss scientific knowledge while maintaining her discursive identity is too often missing in science classrooms; particularly those of marginalized children (Brown, 2004, 2006; Gallas, 1995; Lee, 2001; Lemke, 2001). Several researchers (e.g., Chin, 2006; Delpit, 1988; Hanrahan, 1999, 2005; Lemke, 1990) discovered these language practices further distances marginalized students from science while providing support for more privileged students. Equitable instruction and assessment practises for diverse students involve consideration of their cultural experiences and local discourse, which enable them to connect with science and maintain their identities (Lee, 2001).

By allowing students to maintain these identities, there is support for their funds of knowledge which include the knowledge students' gain from their culture, communities, familial, and linguistic backgrounds they bring with them to school (Gonzalez, Moll, & Amanti, 2005). The use of integrated discourses provides both the context and the tools needed for social and cognitive development, a missing link between home and school still remains (Boyne, 2003; Gallas, 1995; Gutierrez et al., 1999; Hogan & Carey, 2001; Lee & Fradd, 1998; Moje et al., 2001). Presently there is a global initiative of maintaining worldviews, languages, and environments of which science education can be a part (McKinley, 2007). Using the framework of congruence and third space informed by worldview theorists, we are seeking to understand the how and the extent to which scientific discourse is incorporated into the funds of knowledge of kindergarten girls in an urban all girls science academy. We sought to uncover the discourses through the use of photo-methodologies.

With this study, we sought to explore the potential of a digital photo-elicitation method, photo-talks (Serriere, 2010), for understanding integrated discourses (Moje et al., 2001). The objective of this paper is to share this photo-elicitation technique, photo-talks (Serriere, 2010) with science educators so they may use it as an innovative methodological tool to understand the construction of integrated discourses (Moje et al., 2001).

## Framework for Understanding Science Discourse in Classrooms

Engaging in scientific discourse is often difficult for young children as they are learning to articulate their own ideas in written and spoken language. To frame this study, we follow Lemke's (1990) lead that views science as having a specialized system of words that require a particular set of language dependent on concepts and themes. Often, this specialized system of words is not readily made available to the students and can

be difficult as they encounter new ways of talking, reading, and writing. Moreover, school science requires students to integrate the practises of prediction, observation, analysis, and presentation with science reading, writing, and language use (Lee & Fradd, 1998). This ability to *talk science* has served as a gatekeeper to the sciences for many students access to academic success (Lemke, 1990). However research in elementary schools has demonstrated that students can understand and articulate concepts such as observations, inferences, and predictions through instruction that makes explicit connections to science and allows the students to reflect (Akerson & Donnelly, *in press*; Akerson & Volrich, 2006; Akerson, Hanson, & Cullen, 2007).

Studies of discourse in science offer a range of views and provide examples of learning in science classrooms. These discourse studies of classroom interaction revealed how science is framed, who gets to speak in regard to science, and how issues of language use encourage or hinder science learning. Yet, even as science is made available to students through appropriate discourse techniques, many of the studies found limited participation and achievement of students talking science (Carlsen, 1997; Chin, 2006; Lee & Fradd, 1998; Lemke, 1990; Moje et al., 2001; van Zee & Minstrell, 1997). This demonstrates a continual problem for science education and a call for discourse studies in science education with attention on congruence.

We utilize "Discourse", with the upper-case "D", to distinguish the use of the term from a mere stretch of language, lower-case "d", and "discourse". Any stretch of language (discourse) is embedded in a particular way of knowing (Discourse). This way of knowing is linked to communities of practise (Lave & Wegner, 1991) in that certain people share genres of language specialized for a smaller community (e.g., science talk, football talk, music talk). For instance, scientists use words such as, "cell", "bar", "force", and "face" in very different ways than a musician uses those same words. Thus, a register is non-vernacular or often not a natural language for cultural outsiders (Brown & Ryoo, 2009).

Following the lead of several scholars (e.g., Bhabha, 1994; Gutierrez et al., 1999; Moje et al., 2004; Soja, 1996), we call this integration of knowledges and Discourses (Moje et al., 2004) from different spaces the construction of "third space". Third space blends the first space of home Discourse with the second space of school Discourses. According to this framework, third spaces are created when scientific and everyday discourses are combined through authentic integration. By validating everyday discourse, the students understand scientific concepts and are able to incorporate them into their everyday discourse (Moje et al., 2001).

## Photo-Talks as a Means to Uncover How Students Integrate Discourses

As sociologists using photo-elicitation discovered (Ewald, 1996, 2000; Ewald & Lightfoot, 2001; Kistler, 2005) using a photograph instead of a question, particularly when the participant is the subject of that photograph, photo-methodology can generate insightful and unexpected information from the interviewees through reflection (Davis, 1998; Hyde, 2005). Similar to both *Photovoice* (Wang, 2005) and Interpersonal Recall (IPR) (Kagan, 1980), this method, photo-talks (Serriere, 2010) is meant to balance power between the researcher and participants by allowing the participants control over the interview by stopping the slideshow at any moment and comment on a photo. Secondly, the participants can describe the moments to the researcher or teacher, and render the data more complex. This methodological tool is used as a way to remind students about what happened, ask questions about these moments, and access information about how they perceive the integration of discourses into everyday language (Gutierrez, 2008; Moje et al. 2001). As well, photo-talks (Serriere, 2010) provides a tool to understand the perspective of children who are learning to read, write, and incorporate scientific discourse into their daily lives. In this way, we extrapolate the potential of this methodological tool for accessing young children's knowledge of science words. Presently, photo-talks are used in social studies education with a primary focus on social reflection. We chose to work with this particular methodological tool because of its ability to provide a reflective component in a democratic and non-threatening way while providing a visual cue to help the girls' explain their use of new and/or integrated discourses. Thus, in this paper, we describe how photo-talks allowed us to gain understanding of how these girls acquire and understand new scientific discourse.

## Method

### Timing and Duration of Study

To capture the everyday rituals and related discourses, we were in a kindergarten classroom for approximately nine weeks beginning in August with once a week follow-up visits for two months ending in November. Researchers suggest that fluidity and continuity in classrooms can be found in as little as three weeks in the field (Cairns et al., 1995; Serriere, 2007), which we were also able to find. We were in the classroom through the completion of the first science unit, titled, "All about me/all about my city". The content of this unit is an integrated place-based/problem based unit wherein the girls will learn "all about me", which includes lessons on the human body (i.e. body parts, functions of the parts, digestion) and a place-based component titled, "all about my city". In this component, the girls learned what makes their city unique. The content of this component included construction, understanding life cycles, season, water quality, shapes, and measuring devices. During this time, the girls visited local places sites. This unit was aligned to the state standards meeting several standards across the curriculum (including math, science, and language arts standards) with the primary focus on science.

### Context

The enrollment of the District in which we worked was 12,731 students. The ethnic/racial composition was 97% African American, 1% Multiracial, 1% Caucasian, 1% Latino. Sixty-eight percent of the cooperation was free lunch, 30% paid, and 2% reduced. The percentage passing the state test is 50.4%. The graduation rate was 50.3% (IDOE, 2009). Within this district, we concentrated on one school—Harmony Elementary School. The majority of the 433 girls at the Harmony[1] school for science academy for girls[2] live in one of the two public housing developments within four blocks from the school. The

[1]The names of the school and participants are pseudonyms.

[2]The school became a gendered academy in 2004 as a part of a federal restructuring mandate on the school.

 

student population of the school is 99% Black and 1% Multiracial. Additionally, 88% of the students qualify for free lunch. The gendered academy is in its sixth year and initiated a science focus for their academy. For the past five years, the school has made Adequate Yearly Progress for reading and math in all grade levels.

This study took place in one kindergarten classroom in this school. The teacher was Ms. Sanchez. She taught kindergarten for 17 years and at Harmony since it opened its doors in 2004. There were 32 African American girls in her classroom through September; however, the classroom had to be reduced to 24 girls to comply with state laws. The average age of the girls was 5 years and 4 months at the beginning of the study. All of the girls' parents identified their racial background as African-American. All of the girls gave assent to participate in the study and to be photographed. All of the girls' parents gave consent to participate in the study, to have their children be photographed and to have these photographs published.

### Data Collection

Over the span of 9 weeks, we observed, videotaped, photographed and interviewed girls in a kindergarten classroom (n = 24) at an all girls elementary school in an urban area. For this paper, our primary focus is to understand how the use of photo-elicitation, specifically photo-talks (Serriere, 2010), provided insight into the girls' acquisition of new science discourses. The other data sources: field notes/observation and videotaped recordings of classroom instruction were used validate or complicate the data gathered from photo-talks (Serriere, 2010). We present snippets of the responses to the photo-talks to highlight the potential of the photo-methodology, rather than findings. In this methodological tool, which Serriere adapted from *Photovoice* (Wang, 2005) and Interpersonal Process Recall (IPR; Kagan, 1980), digital photographs were taken of a variety of science moments. A slideshow of these moments was created and the girls were shown the pictures, allowing them to stop the slideshow at any picture. Once the student stops the slideshow, time was given so the student could make comments or ask questions about the particular picture. Following these comments, as did Serriere (2010) in her research, we asked questions about what the students were thinking or understanding. The following is an explanation of the three-step process of this methodological tool.

Step 1: We secured permissions and sought to minimize our authority. After proper permissions were obtained from parents, we told the children as a group that she would be taking photos around the classroom and if they do not want their photograph taken, they can tell us or their teacher and no one would be upset with them. Once we began taking photographs, we sought to be as unobtrusive as possible in their already occurring play and work. Generally, we did not hold the camera to her face but instead operated it from a small tripod sitting on a piece of furniture. Moreover, as the classroom was well lit, using a flash was rarely necessary. Still any adult presence with a camera could undoubtedly impact students' perceived freedom of choice and create a presence of *surveillance* (Foucault, 1975). It was imperative to our goal that we sought out not only the most visible and audible groups of children, but also those that may have less voice in science episodes. Moments of integrated discourse were also of central importance to capture in deciding what to photograph.

Step 2: We uploaded the photos. As each morning's science lesson came to a close so did our field notes, audio recording and photography. We then immediately uploaded that day's photos onto the laptop and put them in a slideshow mode.

Step 3: We talked to the girls about their photos. At this point, we invited children one-at-a-time to view the morning's photographs in a slide show format. Depending on their duration, we generally led one to three photo-talks per day. We first reminded the children that they could get up and leave at anytime and no one would be upset with them. Some children immediately took us up on this offer and returned to other classroom activities. Most children seemed to have a sincere interest in looking and talking about the photos. We allowed children to control the forward button on the slideshow so they could determine the length of time they would focus on any one photo. They generally looked and talked about five to seven photos in one sitting, which took about three minutes. We used our field notes to remind children about words and actions surrounding the scene of a photograph. Some children spontaneously led us to the scene displayed in the digital photo, as if they wanted us to better understand what happened. At other times, we asked questions about a photo they found intriguing (see Appendix 1 for example of questions).

### Data Analysis

In order to understand the extent to which this methodological tool is useful for understanding student discourse for science educators, we analysed the data using Miles and Huberman's (1994) open-coding technique. In this way, we coded to understand the methodological tool's potential. Utilizing this technique, we coded the data into related data sets using keywords (i.e. self-correcting of science words, blending new words). After the data was coded using keywords, we gathered the data into related collections (i.e. use of science words) which later became nested collections or the three themes presented in this paper: *Presents recollection of scientific Discourse*, *Describes understanding of scientific Discourse*, and *Provides an opportunity for translation into everyday discourse.*

## Findings

In this section, we present vignettes of the photo-talks *in vivo*. The data is presented in snippets of the transcripts to allow the reader to visualize how the photo-talks transpired, the questions that we asked, the conversations that occurred between the girls and us, and the language the girls used during photo-talks.

### Presents Recollection of Scientific Discourse

This theme describes how the girls were able to recollect certain scientific Discourse via the photo-talks. Often, the girls were able to use the words or invent their own pronunciation of the words (i.e. "microscoper" for microscope). Other times, the girls blended two words (i.e. the words, "pupa" and "caterpillar" blend to become "caterpupa"; "magnifying glass" and "microscope" blend to become "magniscoper"). Similarly, the girls used a word they had heard in class but were they were not always used correctly. Through the use of photo-talks, we are able to check the girls' understanding of the words by showing them a picture of a moment in which they used the word in

class and then ask questions about that moment in time. In this segment, Victory describes to us how she used the word, "pollinating" but does not fully understand the word. The picture (see **Figure 1**) was taken during a "station time" in which the girls were reading about plants and the conversation we had about it:

*CQ*: *You like this picture*?
*V*: *Yes*!
*CQ*: *What were you doing in that picture*?
*V*: *Showing you that they are getting nectar.*
*CQ*: *Nectar*? *What is nectar*?
*V*: *Food.*
*CQ*: *Food for whom*?
*V*: *The butterflies and bees.*
*CQ*: *Okay, and you were telling me that they were pollinating. Do you know what pollinating means*?
*V*: *No.*
*CQ*: *No*? *But you were using that word, huh*?
*V*: *Yeah.*
*CQ*: *So where had you learned that word*?
*V*: *In class.*
*CQ*: *In class, who had taught you that word*?
*V*: *Mrs. Sanchez.*
*CQ*: *Oh, okay so you knew it had something to do with this bee and the flower*?
*V*: *Yes.*
(*PT*1:*V*:05/05/2009:1-14)

Here, Victory was able to incorporate the scientific discourse used by her teacher but not able to make meaning about this word out of its context. This is interesting to note, that Victory was able to use the word during class time but not during the context of photo-talks. Through the use of photo-talks, we were able to capture her use of this word, provide a prompt for recall of this moment, and ask her about it. What is important to note is that Victory understood some aspects of pollination and was able to use the word correctly even though she does not fully grasp the concept of pollination.

Another way photo-talks presented the recollection of scientific discourse was when the girls attempted to use the new words. In a conversation with Shauntaysia (see **Figure 2**), we discovered that the girls would blend or invent new words even though they conceptually understood the science word:

*CQ*: *You wanna tell me about that picture*? [*Shauntaysia nods*] *Okay, what do you wanna tell me*?
*S*: *I was lookin' at the signs in the glasses, and I see a sight.*
*CQ*: *What was that glasses thing called*?
*S*: *Reindeer.*
*CQ*: *No. I mean that thing that, the tool that you were lookin' through, what's that called*?
*S*: *Magniscoper.*
*CQ*: *Almost. A magnifying glass. Do you know what a magnifying glass is*? *What did it help you do*?
*S*: *It helped you to see somethin' bigger.*
(*PT7S*:09.10.2010:4-18)

In this example, Shauntaysia conceptually understood what a magnifying glass was as she described it as, "it helped you see somethin' bigger" and called it a "magniscoper". Here, we understood what she meant and asked her about its use. In this way, photo-talks presented recollections of scientific Discourse (including understanding of these words) by providing the girls with a way to visibly discuss these words and ideas. By employing Gee's conception of upper-case Discourse in combination with the photo-elicitation technique, we see the girls learning new Discourse even though they confuse, blend or invent new words when attempting to discuss these words.

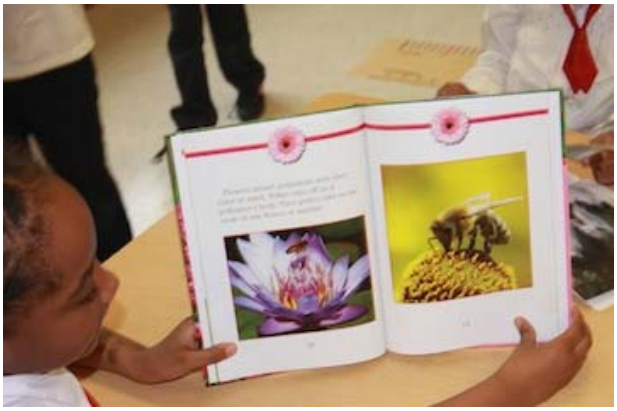

**Figure 1.**
Victory shows me a book and tells me "they are pollinating".

**Figure 2.**
Shauntaysia looking through the magnifying glass.

## Describes an Understanding of Scientific Discourse

In this theme, *Describes an understanding scientific Discourse*, photo-talks shed light on the girls' knowledge of new words. Photo-talks provided a space for insights into the girls' comprehension of scientific Discourse. Additionally, this methodological tool provided us with a tool to help the girls with recall of what happened in class.

In this segment, Mrs. Sanchez was teaching the girls about composting at the same time as she was teaching about plants. She hoped the compost would be able to turn to soil and the girls would be able to add it to the indoor vegetable garden they created. In this segment, Victory describes the definition of a new science word, "germinate". During the classroom instruction, we witnessed a conversation between Victory and Mrs. Sanchez about re-planting Victory's plant (see **Figure 3**) because her seed did not germinate. Later, we spoke with Victory about the conversation:

*CQ*: *Okay, so let's look at all the pictures first and then you can tell me which is your favourite picture of you. Okay*?
*V*: *This one*!

 

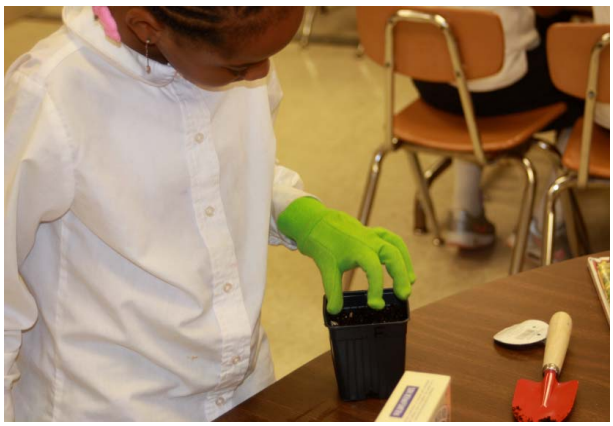

**Figure 3.**
Victory is planting a new seed because her previous seed did not germinate.

*CQ*: *You like that one*? *Why do you like that one*?

*V*: *Because I'm putting a seed in the pot.*

*CQ*: *You are putting the seed in there. And why did you have to put the seed in there again*?

*V*: *Because uh, the first one wasn't growing.*

*CQ*: *So, here Mrs. Sanchez is looking at your shovel at the seed. And she said to you, "That seed, your seed didn't germinate". And you shook your head and said, "No". Do you know what germinate means*?

*V*: *Grow.*

(*PT*1/*V*:05/10/2009:3-8)

During this segment of photo-talks, we were able to remind Victory, what happened in the class. Victory was able to describe the word "germinate" as "grow". During the classroom instruction, she demonstrated her knowledge of this word when responding to her teacher's question about whether or not her seed germinated. By capturing this moment and interviewing her with photo-talks, we were able to discover if she understood the word, "germinate" or if she was attempting to placate the teacher by nodding. In this way, this methodological tool uncovers an important component of discourse acquisition-use and recollection of words.

Similarly as the girls grappled with difficult science words, their understanding was demonstrated through this methodological tool. In the following example (see **Figure 4**), Kimberly demonstrated her understanding of the lifecycle of the butterfly but was confused about compost. She described compost as something that the butterflies eat:

*CQ*: *And how did they become butterflies*?

*KB*: *They first they were a caterpillar and then they kept eating and eating and then they turned into they chrysalis and then one came into a butterfly and then the rest of them came.*

*CQ*: *Okay and what were they eating*?

*KB*: *Compost.*

(*PT*3/*KB*:05/28/2009:19-23)

In this example, we were able to witness Kimberly's understanding of how a caterpillar transforms into a butterfly but also hear her confusion with what compost is and how it was related to the butterfly lesson. Later (see **Figure 5**), she went on to describe her understanding of compost as:

*CQ*: *Kimberly, will you tell me about what went inside the compost.*

*KB*: *Yes.*

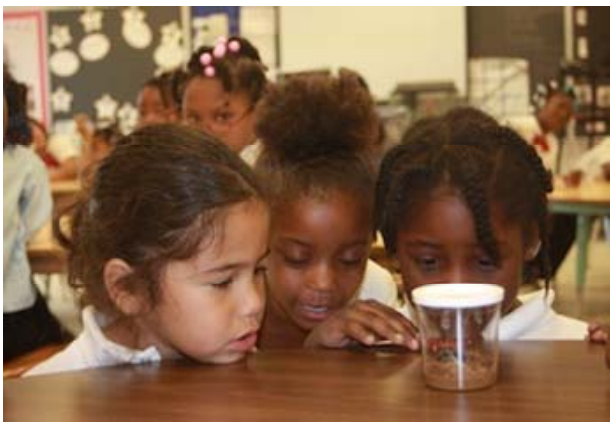

**Figure 4.**
Kimberly (far left) with classmates looking at the chrysalises.

**Figure 5.**
Kimberly (in back) looking into the compost bin.

*CQ*: *What did you put inside there*?

*KB*: *Grapes, potato peels, paper, newspaper, coffee grounds. But we didn't put any cheese in there-cause you know it would rot and stuff.*

Her understanding of what did and did not belong in the compost bin was clear and her ability to articulate this understanding was demonstrated during our photo-talk. In this way, this methodological tool highlighted her understanding of the word, "compost" but also described moments of confusion the girls have during their process of language acquisition.

In another example, photo-talks presented the girls' ability to use integrated discourses. In a lesson about metamorphosis, Sharelle pointed at the tadpoles and discovers one no longer has a tail (see **Figure 6**). She exclaimed during the class, "It is a frog now. It is a frog!" During the photo-talks interview, she asked to look at this picture and wondered how the tadpoles turned into frogs. During this discussion, she came to her own decision about the lifecycle of a frog and used integrated discourses to describe the process:

*S*: *How do tadpoles grow into frogs*?

*I*: *You've been watching them in class. So, what did you notice*?

*S*: *I noticed that they look like donuts but they are all gathered up into a like, uh, sticky jelly like jelly donuts and then when they crack open they will be tadpoles and then it grows front legs and back legs and then moves its tail and then it*

**Figure 6.**
Sharelle pointing at the tadpoles.

**Figure 7.**
Talia and her class running after the butterflies.

*looses its tail and then it become a frog.*

*I*: *Okay alright that is great.*

(*PT2*/*SF*/05.08.2009/20-25)

Here, Sharelle was able to use the language that was available to her to describe the lifecycle stages between eggs, tadpoles, and frogs. While she may not have had all of the technical vocabulary, she was able to talk about the process in her own words using analogies such as the fish eggs looking like jelly donuts. We posit that through the use of photo-talks she was able to reflect on this moment. It provided her with another opportunity to challenge her own thinking about the lifecycle of frogs.

In another example, we talked with Talia and we learned how she understood pollunation and some of the parts of a butterfly (see **Figure 7**). During this class session, in which the girls were going outside to visit their butterflies that they had released earlier that week, we took a picture of Talia and her classmates running towards the grass.

In the photo-talks interview, she described her understandings of the butterfly's proboscis. Although she used the word "straw" to describe it, through this conversation, she describes this anatomy using her own words:

*CQ*: *Okay and here you were running out. What were you running out to go see*?

*T*: *The butterflies.*

*CQ*: *Oh, did you see any butterflies*?

*T*: *Yeah and some of them went to go get nectar but Nikaya had swatted it. She made the butterflies go away.*

*CQ*: *What does nectar mean*?

*T*: *Nectar means honey.*

*CQ*: *And where do you find nectar*?

*T*: *In the flower.*

*CQ*: *Where in the flower-*

*T*: *It is deep down and my cousin, she had gotten honey on my nose.*

*CQ*: *Oh my goodness. And so how does the butterfly eat the honey*?

*T*: *It has a little straw and it goes down into the flower and then it gets nectar.*

*CQ*: *Do you know what that thing is called that long part is called*?

*T*: *It is called, a mouth.*

(*PT3*/*Talia*/05.09.2009/20-33)

While "proboscis" is the accurate scientific word, "straw" also indicates that Talia understood the purpose of this structure to remove the nectar. Considering proboscis is not a word her teacher had used in the classroom, Talia had used the words she had available to her and was able to describe the anatomy of the butterfly. Through the use of this photo-elicitation technique, we were able to check her understanding this word while provide her with a way she could talk to us about her language skills.

## An Opportunity for Translation into Everyday Discourse

In this theme, we discovered photo-talks not only revealed the girls' emerging discourses, but also provided them with the opportunity to translate new scientific discourse into their own vernacular.

As a part of her observational focus, Mrs. Sanchez covered lifecycles of a variety of objects throughout the year. One of her favourite lessons was the lifecycle of the caterpillar. She bought caterpillars from an online store and encouraged the girls to observe their different stages. Then once they morphed into butterflies, she allowed the girls to release the butterflies. On this particular day, the girls noticed a change in the caterpillar—it had turned into a pupa. The girls crowded around the vented plastic container for a look. The girls were making observations about it. In this segment, Victory asked us to stop on this picture of her and her friends looking at the chrysalis. During the interview (see **Figure 8**), she described to us how she would describe the life cycle of the butterfly to her friends.

C*Q*: *You want me to stop here*?

*V*: *Yes.*

*CQ*: *What are you doing here*?

*V*: *Looking at the chrysalis.*

*CQ*: *Can you tell me where the caterpillar is*?

*V*: *In there* (*pointing to the jar*). *First they were a caterpillar then they formed a chrysalis and then they turned into a butterfly*

*CQ*: *Okay and tell me about that chrysalis. What does chrysalis mean*?

*V*: *Like a pupa.*

*CQ*: *What did it look like*? *What did the chrysalis look like*?

*V*: *Gray.*

*CQ*: *What is a chrysalis*?

*V*: *It was an egg then it formed its chrysalis or pupa and then*

 

**Figure 8.**
Victory and classmates looking at the jar with the chrysalis.

*it will become a butterfly. It is like a dressing room.*

*CQ*: *Like a dressing room*? *How would you describe this to your friends*?

*V*: *It is like when you go into the dressing room and put on a church dress, you act like someone different.*

*CQ*: *And that is what the butterflies were doing*? *When the caterpillars are changing into the butterflies*? *I like that example. That is a really good way to describe that Victory. Did you think of that all by yourself*?

*V*: *Yes.*

(*PT*:*V*:05/08/2009:24-32)

In this example, Victory was not only able to define the life stages of a butterfly but also translate the scientific discourse into her own language. As she described the caterpillar morphing into the butterfly, she used the analogy of changing into a church dress. Although certainly there were misconceptions revealed here, what we found important was that Victory was able to make the comparison of the caterpillar's life of becoming a butterfly and when you put on a church dress, "you act like someone else". This ability to use analogies is a critical factor in children's learning of language and content. It not only speaks to cursory understanding but a transfer of knowledge that often leads to success in solving problems (Brown, Kane, & Long, 1989). Similarly it speaks to Victory's ability to feel comfortable using the discourse available to her to describe a scientific phenomenon. Photo-talks helped to demonstrate Victory's ability to use discourse with and/or without meaning and create analogies when translating the knowledge into everyday discourse. This ability is a key component of Third Space construction. Additionally, integrated discourses provide both the context and the tools needed for social and cognitive development (Brown, 2004, 2006; Brown & Ryoo, 2008; Brown, Gray, & Henderson, 2009; Hogan & Corey, 2001; Lee & Fradd, 1998; Moje et al., 2001).

Being able to readily translate the words into everyday discourse was also uncovered through the use of photo-talks. In the following example (see **Figure 9**), Macy was able to describe the process of composting to us in her own words while also using the scientific discourse.

*CQ*: *And um can you tell me what that is right there*?

*M*: *Ummm*, (*pause*) *It is uh, it is soil.*

*CQ*: *Is it soil yet*?

*M*: *No.*

*CQ*: *Nope. What is in there right now*?

*M*: *Uh a worm and and compost.*

*CQ*: *What does compost mean*?

**Figure 9.**
Macy and her classmates touching the compost.

*M*: *Garbage but it is not the stinky garbage it the peelings, you know like the peelings off the banana and orange and grape and apple.*

(*PT*:*M*:05/29/2009:1-8)

During our conversation, she was able to clarify that it is not soil yet and described it as similar to garbage but not "stinky garbage". Through this interview technique, the picture allowed her to be reminded of what the compost looked like, she described it to us and was allowed time for clarification. In this lesson on composting, Mrs. Sanchez helped the girls to understand scientific concepts such as composting as a process of transformation. As we document the discourse in the classroom that incorporates third space construction, we were drawn to these moments where the girls were understanding science concepts, translated these ideas into their own words, but were still teetering between first and second spaces such as Macy's description of compost as "not stinky garbage" but conceptually understanding it is different from the garbage she is familiar. These moments of discourse documented in this classroom help to demonstrate that moments of congruence are not always a perfect blend of the two spaces but representative of both (Bhabha, 1997).

## Discussion

As a result of the photo-talks, we were able to follow the girls' language acquisition, which we could ultimately use to explore and promote Third Space construction in their classroom. In this way, these conversations are one tool that researchers can use to describe Third Space construction from the students' point of view.

Habashi (2005) encourages child researchers to be cautious about unpacking children's narratives about the world around them, watching out not to impose personal perspectives on complex situations and instead making every effort to deconstruct the child's voice and vision before inserting one's own. These suggestions challenged us to explore a broader array of data collection and data analyses options; allowing us to explore the many ways in which children communicate. Not imposing personal perspectives on complex situations, such as language acquisition of young, African American girls, is another reason to listen to their voices, and use photos to elicit thoughts on the world around them.

These moments of discourse documented in this classroom

help to demonstrate that moments of congruence are not always a perfect blend of the two spaces but representative of both first and second spaces (Bhabha, 1997). As the girls become more comfortable with their new words, they are creating new knowledge and discourse. Sometimes these discourses are more integrated (i.e. Victory describing the metamorphosis of a butterfly as a dressing room) which represent the integrated discourses that Moje et al. (2001) document.

Photo-talks were able to render our data more complex. For example, when Victory speaks the new science word in class "pollinating" (see **Figure 1**), but is not able to describe the word to us in the photo-talks conversation, we were able to see what words she was having difficulty adding to her register. Without the use of photo-talks, we might have assumed she understood the word when she correctly identified the word and described it to her peer. However, during the conversation the complexity of her understanding was revealed: while she could use the word correctly, she still had difficulty describing its meaning. While Victory was able to use the science word in the second space, the science lab; she was having difficulty translating the word into her everyday discourse. In this example, congruent Third Space for Victory was not yet achieved.

Secondly, when Shauntaysia names a magnifying glass as a "magniscoper" without the ability to probe deeper, we might have assumed she did not understand what a magnifying glass was. However, she conceptually describes it as "something that makes things bigger" and blended two new words, "magnifying glass" and "microscope". Both new words and new science tools they were using in the science lab. Photo-talks allow science educators to recognize students' understandings rather than see how they are wrong or incorrect. Thus, photo-talks add a layer of reflection on the third space and a way for teachers to understand students' use but also a way for researchers to access it.

Additionally, photo-talks allowed us to witness the girls using the scientific discourse. Bhabha (1994) discusses making words "one's own" and we posit through this methodological tool, it provides another space for the girls' to practise incorporating the new words into their vernacular (p. 293). Moreover, this reflection time, allow the girls to dip into the third space again and become constructors of this space. In this way, the photos provide a backdrop to ask questions about their understandings of this Discourse.

## Conclusion

Through the use of this methodological tool, we found the conservations to be directed by the girls and insightful into their learning of their new and/or integrated discourses. Through the use of photo-talks, we gained an understanding of the girls' language acquisition and Third space construction. In this way, these conversations are one tool that researchers can use to describe third space construction from the students' point of view. Additionally, conversations around photographs allowed for different types of data that both confirmed and served as anomalies in comparison to field notes, video observation, and teacher interviews. Overall, this methodological tool provided us a way to check initial interpretations on third space construction and acquisition of science discourse in a kindergarten classroom. In this way, science educators can benefit from this methodological tool as a reflective tool with their participants, to validate and/or complicate their data.

The majority of the science discourse research continues to be focused on one particular space: either scientific or instructional discourse. However, in order to understand how students integrate this knowledge in their daily lives and truly teach science to all, we must include the other aspects that contribute to authentic science learning through congruence. In order to create congruent learning spaces in science, students must be able to maintain their identities, language, and worldviews by allowing students to translate scientific discourse into their everyday language and photo-talks is a methodological tool that can enable researchers to document these spaces.

As our science classrooms continue to become linguistically diverse and increasingly complex, it is becoming more difficult to prepare teachers to attend to the language needs of all students (Lee & Fradd, 1998; United States Census Bureau, 2000). As science educators, we must be able to help educators create spaces that encourage third space construction so that these marginalized students can succeed in science. By providing educators with ways to integrate scientific and everyday discourses, we can help achieve this goal. Photo-talks is one methodological tool that helps to remove power issues during research and provide a way to visualize these third space moments through conversations with students.

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## Appendix 1

Script: I am going to show you some pictures of your class. You can stop me at any time to look at a picture again or ask any questions. I am just going to ask your ideas about what was happening. There are no right or wrong answers. At any time, you can stop me and tell me that you do not want to do this any more and no one will be upset with you.

1) What was your favorite picture of you? Why?
2) Looking at this picture, what were you doing here?
3) Why were you doing that?
4) What do you think you learned while doing this?
5) Here, your teacher said, "…" What did that mean to you?
6) Did you understand the word "…"? What does that word mean to you?
7) Here, you said, "…" Would you like to add anything to that?
8) If you were to describe to your friend, what you were doing here, what would you say?
9) Have you heard anyone outside of school, like a parent, brother or sister, use the word, "…"? What were they talking about?
10) What about on television or in movies? Who do you hear using these science words that your teacher used today?
11) Is there anybody you know who does not use words like this? Why not?
12) Looking at this picture, were you enjoying/not enjoying what you were doing? Why?
13) Think of one memory you have of <context of investigation>. Tell me about it.
14) Thinking back to <context of investigation>, what do you remember?
15) What did the other people do during this time?
16) If there was one thing you would say about that event it would be…
17) How would you describe how this made you <act, feel, understand other words> during other times?
18) Is there anything else you'd like to tell me?
19) Did I miss anything.