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Becoming a Content-ESL Teacher: A Dialogic Journey of a Science Teacher and Teacher Educator

This dialogical narrative describes the observations and changes in instruction of an 8th-grade science teacher in an English language learner (ELL) sheltered science class before and after receiving instruction in ESL methods, and the backdrop for the teacher's growth, as narrated by the second language teacher educator who directed the teacher's professional development program. After receiving instruction in language acquisition theory, and strategies in teaching reading, writing, and listening to ELLs in content classes, the teacher's lessons were designed and conducted utilizing the newly acquired skills.

The science teacher's transformation from content to content-ESL teacher was scaffolded via contemporary professional development models for ESL. Such training, it is argued, can provide content teachers the tools they need to work more effectively with ELLs in their classrooms. Narrative introspection can assist in reflective practice, as well as in meeting standards for professional development and licensure, for teachers and teacher educators alike.

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Lori: I can still remember the looks on the students' faces, and my own feeling of inept frustration. As I looked around the room, I realized not one of my 17 English language learner (ELL) science students had any idea what to do with the assignment I had just given them. I had been their teacher for four months, and I was still making the same mistakes. Most days, I did all the talking, and was met by blank stares. But today, as they sat staring at a list of

20 speed and velocity equations, I knew for the first time, with perfect clarity, that I was in over my head. I needed to make a change in the way I was teaching these children, but I had no idea where to begin.

Karen: During my time as a second language teacher educator, I've worked with many experienced content teachers like Lori, who feel the same acute frustration in the very milieu where they have seen themselves as experts. When I first met Lori, at a workshop that I and my colleagues in the ESL-Content Teachers Collaborative (ECTC), Dr. Kathleen Romstedt and Dr. Keiko Samimy, hosted in her school district in the fall of 2007, she was one of the most vocal participants, as a content teacher in the school district with the highest enrollment of ELLs in the state. She needed answers, and we agreed to provide a forum for the teachers in our year-long journey together, in the professional development cohort program that Lori had just agreed to join. We first needed to get to know her, build mutual trust, and progress, alongside her, in our understanding of her needs as a teacher, as we strove to offer her compelling content in our program. For us as teacher educators, we also needed feedback on the applicability of our program's content, in order to best serve our teacher-learners' needs. If our content was lacking in substance or applicability, then it would need to be modified.

BAKHTIN (1982) DESCRIBED HOW in literature, dialogic works inform each other, and in turn, are continually informed and reformed in the process. For teachers, the process of narrative introspection can compel them to evaluate their new learning in relation to what they already know as experienced teachers. For teacher educators, receiving concrete feedback on teachers' insights into student learning, assessment of students' difficulties, efforts to make content accessible to ELLs, and concrete modification of classroom practice, can clearly inform the content of professional development. Without such introspection on the part of teachers and teacher-educators, the impact of coursework on teacher learning and classroom practice would be merely speculative for all parties involved.

After the completion of our year-long program, my colleagues and I invited Lori to express in writing how she applied her learning, citing the most salient examples from her coursework and teaching practice, so we could better understand her teaching context and how program concepts transferred (or didn't!) into this context. This article illustrates, in a dialogic discussion, how our work together as content-ESL teacher and teacher educator was a process of mutual growth. Through reflection and introspection on each other's reasoning, both of us arrived at new understandings of our own professional practice.

Lori: I have taught science at the same urban middle school for 14 years. My first year's grade book was peopled with names like Mary and John. As time passed, our demographics changed. In my school of 800 students, we now have over 150 ELLs, many of them newcomers. As a veteran teacher, I've had ELLs in my classroom before. In the days when we had a middle school team schedule, we even called ourselves the ELL team. In retrospect, however, we offered ELLs nothing more than a smile and a chance to sit next to a student who also spoke the same language. Having abandoned the middle school team concept for a traditional high school-style schedule, we had nothing in place to shelter these children. They were scheduled into any content class, and aside from limited TESOL (Teaching English as a Second or Other Language) services, they were left to fend for themselves. It was time to adapt to the changes of our clientele and do more to help these children with language acquisition. Consequently, our district created our Sheltered Instruction, or SIOP (Sheltered Instruction Observation Protocol) class, as we call it (Echevarria, Vogt, & Short, 2008), deciding that ELLs would see the TESOL teacher for their language class, but those with the lowest scores on the OTELA (Ohio Test of English Language Acquisition) would be grouped together for their content classes of math, science, and social studies. A volunteer content-teacher would take this class, knowing that when a student had achieved a certain level of competence, they would be transitioned into that teacher's regular content class to allow the teacher-student bond to remain intact, yet enable those students who

were capable, to be pushed harder. Six teachers stepped forward, and I volunteered to be the 8th grade SIOP science teacher. Figuring I had experience, I volunteered with no qualms. Four months later, I had resorted to giving these children a list of speed equations. It was time to admit that teaching ELL students required a different set of skills than the ones I had.

Karen: I could tell immediately that Lori's background knowledge of ESL exceeded that of most content teachers I've worked with, thanks to her district's proactive stance toward addressing some of the needs of their burgeoning ELL population. But how much did she already know, and how open would she be to working with us, I wondered? I was soon to discover her level of passion and commitment, via her journal entries, our conversations, and in team meetings with my colleagues.

New Knowledge

Lori: To address my lack of skills, I enrolled in The Ohio State University's ECTC program. This program allowed content teachers from across the state to begin work on required courses for TESOL endorsement, allowing us direct communication with teachers from other districts also in the program. I am a constructivist science teacher, drawing from my knowledge of Vygotsky's (1978) emphasis on scaffolded instruction. I always take time to investigate my students' prior conceptions, expose them to flaws in their rationale, and explore new concepts in lab. For instance, to investigate frames of reference, I hold a ball in my hand, and rollerblade across the room. The day's question is, "Is the ball moving?" Students know the answer; unfortunately, the answer they know is often incorrect. Students are encouraged to express their reasoning and argue their positions. The discussion is intense, engaging, and often frustrating, and doesn't end until we can all explain why the ball is, yet is not, moving at the same time. I have never given any of my students a list of equations and word problems. And yet, I had just handed one to my most vulnerable students. It was my lowest point as a teacher of ELLs, and also a turning point of sorts, for me as a teacher. I began to investigate

ways to learn more about teaching ELL students through my first TESOL methods class in the ECTC program.

Karen: My colleague, Dr. Kathleen Romstedt, was Lori's instructor in our first of four courses, taught via asynchronous distance education, and as teacher educators working in a distance learning format, we conferred in multiple staff meetings about appropriate textbooks and learning activities for the 29 content teacher-learners in our program. Dr. Romstedt worked diligently, in what was a new teaching medium for her, to establish a solid foundation and curriculum tailored to meet teachers' specific needs for working with ELLs, selecting texts from Faltis and Coulter (2008) and Reiss (2005) for the course. These were, in turn, buttressed by Echevarria, Vogt, and Short's (2008) SIOP model throughout the class, and in three workshops with program participants. But what impact would this first course have, we wondered? How might our course and overall program objectives be realized in Lori's classroom, for the benefit of her ELLs?

Learning About Language Acquisition Theories

Lori: The ECTC's first class broke down ESL education into four main parts: linguistic theory, and strategies for reading, writing, and listening. As a science teacher, linguistic theory had escaped my notice. I was overwhelmed with teaching my ELLs, and unable to figure out where to begin making improvements. Now, hearing theories for the first time, I was able to identify their components within my classroom. Krashen's (1981) input hypothesis, the role of cognitive load and U-shaped learning in second language acquisition (Renkl, Atkinson, Maier, & Staley, 2002), and Swain's (1993) theory of comprehensible output made the most sense to me, because I could see them manifested in my students. The input hypothesis, represented by $i + 1$, explained the forlorn looks on students' faces when I asked them to solve 20 speed equations. Krashen explains that language input (i) should be comprehensible and challenging, yet only one step ($+1$) away from students' current

mastery level. In situations that are too challenging, the learner will have no shot at the task. There was nothing comprehensible about the input I was providing, and there hadn't been for a very long time; with a few notable exceptions, there hadn't been anything comprehensible in the entire four months! Knowing this theory helped me understand that instruction for ELLs was not about dumbing anything down; it was simply about reaching the students where they were, and taking them to where we needed to go. To teach earthquakes, I now use a modified version of the Federal Emergency Management Agency's Tremor Troop Wattsville Earthquake activity (National Science Teachers Association/Federal Emergency Management Agency, 1990). In this activity, we use the song "Take Me Out to the Ballgame" to locate the epicenter of an earthquake. Students hear callers reporting in to the local radio station about which verse of the song they heard when they first felt the quake. By logging the number of seconds into the song, and then finding the callers on a map, my students locate the epicenter. We then reinforce this concept by examining reports of damage at each location, using the Modified Mercalli Scale, learning that damage is worst, closest to the epicenter. Then, using seismograms showing different amplitudes, we locate seismograph stations around town, and place the correct seismogram with the station that reported that amplitude of wave. The science content is all there, but it is now more comprehensible, because of its interactive, task-based, and meaningful nature, and thus, also within students' cognitive reach.

The second idea that impacted my teaching was my understanding of how cognitive load impacts performance and how this relates to second language acquisition. As Dr. Romstedt explained, early second language learners will lean on the structure of a lesson and the assistance of the teacher when learning something new, thereby making few errors. As they move away from this support, their error rate increases until accuracy may drop significantly. However, as competency with the language increases, the error rate decreases until fluency in the second language is achieved. Understanding this phenomenon made me more confident as a teacher, because I now realized that errors were acceptable, a natural part of second language

development. I had previously been viewing students' stage of interlanguage (Selinker, 1972) as my own personal failure as a teacher. I took this new knowledge and applied it to my classroom. I was now able to place children along the continuum of the U-shaped learning curve. In application, this theory helped me most with parent communication. I now begin almost all my conferences by drawing an imaginary U in the air, briefly explaining the stages of language acquisition, and then showing the parent where their child is in their English development. As I describe the middle stage of interlanguage to them, I also impress upon them the importance of affective influences.

To the adolescents I teach, who are self-conscious on a good day, I explain that comprehensible output is critical to acquiring the second language. Swain's (1993) theory of comprehensible output states that if language is not produced, it will not be acquired. It is possible for a student to comprehend English, but not be able to produce it. Producing while in the interlanguage stage takes guts. It is embarrassing for many students to speak with so many errors, yet it is necessary for their development of English, and I let students know that my classroom is a safe place for them to experiment in their attempts at language production.

Karen: Lori's introspection in these three examples is quite significant, as she boldly admits her shortcomings and even failures with her ELLs—a humbling proposition for any teacher! Her narration shows clear application of her learning of language acquisition theory from her coursework to concrete instructional needs as a science teacher, which represented a crucial achievement of one of our professional development goals for the content teachers in our program.

Strategies for Listening

Lori: By the time the ECTC class addressed listening, I was more focused. I was making better observations of my students. My student Ayan was still in the interlanguage stage, and with her hearing loss, I was concerned how long she would remain there. I began to ask questions about what to do with my shy Betsa, who was not producing language at all, yet had been in

the U.S. more than a year. If I pushed her, would her affective filter rise? These concepts were so new to me, yet I began to think about them daily. One statistic brought my musings about theory crashing into the world of concrete production. In an ECTC class lecture, Dr. Romstedt stated that listening is the language skill we use most. Estimates vary depending on the context in which the listening happens, and the range is from about 60% in conversation to about 90% in academic context. She then explained that, traditionally, we do not teach students how to listen. I realized I had been the one doing all the talking for the last four months of the school year. I had assumed that my students knew how to listen to me, assumed they would be able to let me know if they needed more help or another go at something.

I realized I had no idea how to teach children how to listen. “Sit up straight” and “Look at me while I’m talking” didn’t seem to be the right approach. Instead, I decided to give them words they might need so they could listen better. By providing key phrases appropriate for a classroom setting, I empowered ELLs to ask questions if they didn’t comprehend. I created a poster for my classroom with such phrases as, “Can you repeat that?,” and “Could you write that new word on the board?” The students responded positively to this idea. One student thanked me for giving him the handout of the poster as he left the room. My building colleagues reported to me that the ELLs were looking at my handout while in their content classes! We all now have an enlarged copy on bulletin boards in our classrooms for easy reference for all students.

Karen: Lori’s narrative fluidly incorporates the language of theory, highlighting such concepts as *interlanguage* and *affective filter*. Her phrase handout had a significant impact on the ELLs in her classroom, carrying over to other classes and even gaining her colleagues’ attention and replication. One of the goals for our professional development program is for participants’ learning to have a ripple effect on their district colleagues. Thus, it was extremely meaningful for us to learn that her handout served a dual purpose. And such immediate feedback is perhaps only possible for teacher educators to learn of, if their teacher-learners are simultaneously

teaching in their own content classrooms, and thus able to experiment with their new learning. Were it not for Lori’s sharing this, we would have lacked concrete validation for our efforts.

Strategies for Reading

Lori: The next week, our class began to explore reading. Dr. Romstedt noted in her lecture that, for those teaching content, we need to think about how to teach reading to ELLs, and not just focus on the transmission of content through reading, particularly since some ELLs may have a limited background with reading in their first language. We were instructed to begin by planning a coherent content curriculum with our students’ needs in mind, with reference to content standards for 8th grade science and standards for ESL instruction (Ohio Department of Education, 2007, 2008). Until this point, I had been following the curriculum line of my regular science education classes. I have never been a big fan of textbooks, as I prefer to spend class time engaged in a lab or a debate. I began to understand that ELL students needed the foundation that a textbook can provide and that the textbook would serve as the basis of the coherent curriculum I was designing for them. Our textbook series offers a workbook called *Reading Essentials* (Glencoe-McGraw-Hill, 2008) that mimics our regular textbook, albeit trimmed to the most important concepts, and brings the reading level down by two grade levels. Now *Reading Essentials* is the new curriculum line for my SIOP class. However, just because I had found an appropriate text to use, didn’t mean I was ready to teach reading!

The ECTC program exposed me to a wide variety of reading strategies, all empirically supported by research. I found myself embracing three: activating prior knowledge, ensuring word recognition fluency, and summarizing text. Before I begin a lesson now, I show students pictures related to the concept to be learned. For example, I have photos of the 1999 Turkish earthquake. As we discuss these pictures, we develop a list of “Important Science Words” related to the pictures, such as epicenter, damage, and earthquake. I get a good sense of ELLs’ current levels of prior knowledge during these sessions, and it informs my subsequent

instruction. I then conduct lab activities and demonstrations for each concept. To investigate faults, we create three-dimensional models of a section of ground, and cut them on the diagonal. By manipulating them differently, we emulate strike-slip, transform, and normal faults, calling out the names of each as we go. We label the corresponding pictures with content vocabulary on a *foldable* (or word reference list). We then reinforce knowledge by viewing an online, animated module that simulates an earthquake and resulting ground movement for each of the three faults (Regents of the University of California, 2006). An unfortunate, grazing sheep we nicknamed Sheldon, meets a variety of fates during the earthquake, depending on the fault type. Only after these activities do we read the corresponding text in *Reading Essentials*. By this time, the students have a framework in place and are able to contend with paragraphs in English. They know key vocabulary associated with the topic, which ensures word recognition fluency. They do not have to decode content words, because we have been using them in practice. Finally, they write a one-sentence summary for each paragraph. By having the students summarize, I can immediately check comprehension. And because they already know the content, I can focus on helping them *learn* to read.

Strategies for Writing

Lori: The final topic we covered was student writing. Dr. Romstedt explained in a class lecture that even though students may have difficulty with the grammar system of English and with our terrible sound/symbol correspondence, they are able to express ideas. As part of the lecture, we analyzed a sample of student writing from a college-level class. I realized I was looking at something very similar to what I had seen my own students producing. The sample was so jumbled that the message broke down in several places, and grammatical and vocabulary errors were prolific. In short, it was a disaster, and I had no idea where to begin helping the student make improvements. I am not trained in writing instruction, and realized I had been so overwhelmed by where to even begin, that I had shied away from having students write more than a sentence or two all year. With guidance,

I began to focus first on the meaning. Was the message conveyed? Did the student fulfill the requirements of the assignment? Once that was done, I began assessing language errors, choosing a limited number of items to edit. Finally, I was instructed to allow rewrites and second drafts. In retrospect, it was a fairly obvious solution: Read the paper twice, once for the science and once for the English, and then let students fix it before I accept it for a grade. I was ready to try out these suggestions, and a series of labs I planned on convection provided the perfect opportunity.

I conducted a lab using food coloring placed in a tray of water resting on cups containing hot or cold water. I asked students to record observations made after each of three trials. As I circulated, I scanned student writing for two word pairs: hot/up and cold/down. I was reading for content only, and by the end of the lab, was aware that each ELL had grasped the main concept. The next day, I asked them to discuss their observations in small groups. I introduced new vocabulary such as sink, rise, and convection current. They then needed to produce a single paper with a partner that listed three observations and three inferences made from the previous day's lab. I also requested they focus on capital letters. The papers showed improvement from the day before. Articles were missing and verb tense was all over the place, but the ideas were there, the vocabulary was correctly used, and there was not a capital letter out of place.

The next day, we recreated the same lab. This time, I asked students to predict what would happen in each trial and record the results. Students required prior knowledge to predict, but they now had the vocabulary and definitions they needed. As I circulated, I began addressing spelling and grammar on an individual basis, limiting modifications to no more than one or two items. By the end of the day, the papers I received looked like some of my lower-level L1 English-speaking students' papers. The final step was a formal assessment. I approached our TESOL tutor and requested a writing rubric. I chose a four-point, holistic rubric that aligned itself well with the OTELA. A student receiving a score of "1" on this rubric has very limited English. A "4" means that the writing is indiscernible with my L1 English speakers. The next

day, I put it to use. I conducted a demonstration in which blue liquid was poured into a cup with a hole drilled into the bottom. The cup was attached to the inside of a fish tank filled to the top with water. The blue liquid sank to the bottom of the tank, and slowly made its way to a corner where a jar sat. As it approached the sealed jar, which was filled with a red liquid, the blue color began to climb. This writing prompt was assigned: "Describe the demonstration. What temperature was the blue liquid, and how do you know? What temperature was the red liquid, and how do you know?" As I graded the papers, I read them twice. The first time through, I graded only for science content. Did they answer the prompt, and was that answer scientifically accurate? The second time through, I followed the rubric. I assessed for level of writing proficiency. I wrote both scores on the paper before I added them together to achieve the final grade. I find that by using this rubric the whole year, I can see patterns in students' writing, and the four-point scale makes it incredibly easy to explain students' progress to parents during conferences.

Karen: Lori narrates additional, crucial concepts that she learned relating to content-ESL instruction, such as: consideration of students' prior reading experience in L1; curriculum planning in conjunction with state standards for both content and ESL; building background knowledge; modified and task-based instruction; use of adapted (yet content-rich) readings; student grouping strategies; checking for comprehension; and the use of clear rubrics in assessments that incorporate both content and language. All the concepts she learned saw immediate application in her instruction and assessment activities. Lori's narrative introspection clearly demonstrates how our program's instruction was achieving impact.

Conclusion

Lori: It has been a full year since I was a participant in the ECTC program. The first four months of teaching ELLs before my participation in the ECTC program were very difficult for me. I knew I was making mistakes, but was unaware of how to fix them. Although I

had always designed student-centered activities, I was not finding success in my ELL class with similar techniques. Thankfully, the ECTC program exposed me to linguistic theory, as well as instructional strategies, allowing me to make informed observations of my students and improve my parent communication. I can now explain to a parent why I am asking a student to perform certain tasks. I have learned that listening is a skill that can be taught, and I have developed tools to do just that. I am able to prepare my students before they read a passage to deal with the vocabulary they encounter and actively read for comprehension. And finally, I have learned to read student writing first for meaning, and second for language usage. I give students multiple opportunities with a piece of writing, guiding their editing process with language rules before I take the paper for a grade. And I now consider myself a content-ESL teacher.

Karen: Lori discovered that she was already using techniques that the research promotes, and she is now able to frame them within an ESL context. Training programs, such as the one we offer, allow content teachers to improve upon what they already know and do, building upon their years of expertise as educators; narrative introspection, which we have pursued in this [article], promotes reflective practice that meets standards for professional development (and our state's TESOL endorsement) for teachers and teacher education programs alike, and provides validation of teacher learning. What I learned from this narrative introspection is that, in order to gauge the impact of new learning, teachers in professional development programs need to learn concrete strategies that have immediate application to their classroom and that build on what they already know and do. I also have seen empirical validation of suggested best practices for ESL teacher professional development, as advocated by the research literature that emphasizes integration of language and content teaching strategies for ELLs. Similarly, Lori's success with applying her new learning demonstrated to her the validity of the new knowledge, and likewise, validated the effectiveness of her teaching practices. As Lori's narrative clearly illustrates, even one class can have a tremendous impact on content teachers who work with ELLs.

Lori: I think my case is probably not unique. All across the country, content teachers are faced with increasing numbers of ELLs. Often, the training we have received to meet the challenge has been minimal or nonexistent. I myself received no training in TESOL techniques during either my undergraduate or graduate programs. I was unable to be effective as a teacher of ELLs until I was exposed to linguistic theory and specific strategies for teaching English to language learners. If content teachers are offered such training, their competence and confidence in teaching ELLs will rise. I knew how to teach, but I did not know how to teach ELLs. However, my TESOL training put me on the right track.

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