THE ROLE OF CRITICAL REFLEXIVITY IN THE PROFESSIONAL DEVELOPMENT OF PROFESSIONAL DEVELOPERS: A CO-AUTOETHNOGRAPHIC EXPLORATION

O PAPEL DA REFLEXIVIDADE CRÍTICA NO DESENVOLVIMENTO PROFISSIONAL DE FORMADORES DE PROFESSORES: UMA EXPLORAÇÃO CO-AUTOETNOGRÁFICA

EL PAPEL DE LA REFLEXIVIDAD CRÍTICA EN EL DESARROLLO PROFESIONAL DE LOS FORMADORES DE PROFESORES: UNA EXPLORACIÓN CO-AUTOETNOGRÁFICA

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ABSTRACT

This manuscript shares findings from a collaborative autoethnography project during which two classroom teachers worked together with university researchers to develop and facilitate science education professional development workshops for elementary teachers in Luxembourg. Grounded in critical theoretical perspectives, we undertook a process of collaborative autoethnography grounded in dialogue and reflection, to examine our **own** professional development in the process of facilitating the professional development of our colleagues. First, we elaborate the cultural and historical importance of this project in the context of teacher professional development in Luxembourg, an education system that operates from a national primary school curriculum, but in which instructional decisions are made by teachers. Next, we describe how critical methodologies allowed us to examine working within this system from each of our unique perspectives, while critically analyzing the process

of engaging in professional development with tea-chers. We then elaborate the two main claims that emerged from our collective processes of reflec-tion, dialogue, and action, namely that undergoing this critical process in parallel with supporting tea-cher professional development facilitated changes in our perspectives and our positions towards the national curricula, and that our multiple roles cou-pled with the process of reflection-dialogue-action mediated taking agency and the adaptation of pri-mary science curricula.

KEYWORDS

Co-autoethnography. Critical Pedagogy. Teacher Re-search. Teacher Professional Development.

RESUMO

Este trabalho compartilha as conclusões de um projeto de auto-etnografia colaborativo durante o qual duas pro-fessoras da educação primária trabalharam em conjun-to com pesquisadoras universitárias para desenvolver e implementar oficinas de treinamento para professores da educação básica em torno da educação científica no Luxemburgo. Partindo de uma perspetiva teórico-crítica, iniciamos um processo de auto-etnografia colaborativa, baseada no diálogo e na reflexão, a fim de examinar nosso próprio desenvolvimento profissional durante o processo de facilitar o desenvolvimento profissional de nossos colegas. Primeiro, aprofundamos a importância cultural e histórica desse projeto no contexto do desen-volvimento profissional de professores em Luxemburgo, um sistema educacional que opera a partir de um currí-culo nacional de educação primária, mas no qual as de-cisões sobre o ensino são tomadas pelos professores. Em seguida, descrevemos como metodologias críticas nos permitiram examinar o trabalho dentro deste sistema a partir de cada uma de nossas diferentes perspetivas, ao passo que analisamos criticamente o processo de envol-vimento no desenvolvimento profissional com professo-res do ensino fundamental. Dessa forma, nos aprofunda-mos nas duas principais conclusões que emergiram de nossos processos coletivos de reflexão, diálogo e ação, a saber, que vivenciar esse processo crítico em paralelo ao apoio ao desenvolvimento profissional do profes-sor facilitou a mudança em nossas próprias perspe-tivas e posições em relação aos currículos nacionais, e que os nossos múltiplos papéis, juntamente com o processo de reflexão-diálogo-ação mediada na toma-da da agência e a adaptação dos currículos das ciên-cias da educação primária.

PALAVRAS-CHAVE

Co-autoetnografia. Pedagogia Crítica. Pesquisa de Professores. Desenvolvimento Profissional Docente.

RESUMEN

Este trabajo comparte los hallazgos de un proyecto de autoetnografía colaborativa durante el cual dos maes-tras trabajaron junto con investigadoras universitarias para desarrollar e implementar talleres de formación de profesores de primaria en torno a la educación en ciencias en Luxemburgo. Partiendo de una perspectiva teórica-crítica, emprendimos un proceso de autoetno-grafía colaborativa basada en el diálogo y la reflexión, con el fin de examinar nuestro propio desarrollo profe-sional durante el proceso de facilitación del desarrollo profesional de nuestros colegas. Primero, profundizamos en la importancia cultural e histórica de este proyecto

en el contexto del desarrollo profesional docente en Luxemburgo, un sistema educativo que opera a partir de un currículo nacional de educación primaria, pero en el que las decisiones sobre enseñanza las toman los profesores. A continuación, describimos cómo las metodologías críticas nos permitieron examinar el trabajo dentro de este sistema desde cada una de nuestras diferentes perspectivas, mientras analizamos críticamente el proceso de implicación en el desarrollo profesional con los profesores de primaria. Luego profundizamos en las dos principales conclusiones que surgieron de nuestros procesos colectivos de reflexión, diálogo y acción, a saber, que el experimentar este proceso crítico en paralelo al apoyo al desarrollo profesional del docente facilitó el cambio en nuestras propias perspectivas y posiciones hacia los planes de estudios nacionales, y que nuestros múltiples roles junto con el proceso de reflexión-diálogo-acción mediaron en la toma de la agencia y la adaptación de los currículos de ciencias de educación primaria.

PALABRAS-CLAVE

Co-autoetnografia. Pedagogía Crítica. Investigación de Profesores. Desarrollo Profesional Docente.

1 INTRODUCTION

This manuscript highlights findings from a co-autoethnography in a collaborative project whereby two teachers work with university researchers to facilitate professional development workshops in science education for elementary teachers. Our work is situated in the European country of Luxembourg, and during the past years, our country has invested much in the areas of science research. Recent policy recommendations in our national context have highlighted the role of science as one of several decision-making tools citizens may use to inform their lives, and thus emphasized the importance of a strong science education (HAZELKORN et al., 2015).

In our context, a national curriculum reform was initiated in 2009, which revised the primary school curriculum to be competency-based, and a related curriculum document was published in 2011. Thus, there are new curricular guidelines that teachers need to work within to support the development of students' competencies, however teachers are often unsure of how to teach in competency-based ways.

With the aim of supporting teachers in transforming their praxis to respond to changes required by a competency-based approach to teaching, the project we detail here seeks to facilitate the sustainable promotion of science in primary schools. This aim is simultaneously rooted in the specific needs and strengths of the national education system, and is based on a global body of research on supporting quality science education. To reach this aim, we have developed a project anchored in a collaborative science teacher education network for primary school educators, the project, Science Teacher Resource Center (SciTeach Center), which seeks to provide sustained professional development for teachers.

Teacher participants are offered pedagogical workshops to support them in engaging their students in the practices of science. These workshops are coordinated by two teachers together with three university researchers, all authors of this paper. Through this collaboration we have undertaken co-autoethnography to examine our **own** professional development in processes of facilitating professional development for colleagues. We wondered how being positioned to deliver professional development impacts our **own** professional development. Guided by critical theoretical perspectives (FREIRE, 1968) we seek to provide spaces where participants (us) could make, and re-make knowledges, and ideally work towards transformation (SCHOR; FREIRE, 1987).

We see such transformation as a "continuous process that explores relationships between thinking and acting

as part of a broader process of working for social justice and equity" (VAVRUS, 2006, p. 90). In this study, the transformations we hoped for relate to our identities as teachers of teachers, and our positioning as teachers of science. Thus, the goal is to examine the professional development of the professional developers themselves (us, the five authors of this manuscript), through a reflexive process of collaborative autoethnography (co-autoethnography) grounded on reflection, dialogue, and action.

2 CONTEXT

2.1 PRIMARY SCIENCE EDUCATION IN OUR CONTEXT

Much of primary teaching in our national context is structured through transmission-based pedagogical approaches, and teachers are typically viewed as 'experts' with knowledge to impart to children. Science as a school discipline is often positioned as a collection of facts, and as such, learning science is interpreted to mean being able to recite and describe multiple facts and scientific descriptions. As introduced above, the government passed a law in 2009 redefining the primary school curriculum to include a focus on students developing competencies in different disciplines. Shortly following this, a new national curriculum was published (MENFP, 2011) that details instructional goals in terms of competencies students should develop.

This new curriculum details how science instruction should facilitate students learning of science through engagement with science practices. This approach to science education is more in line with recent international policies and curricula (NRC, 2012; NGSS LEAD STATES, 2013; ROCARD et al., 2006) than the previous curricula. While the new curriculum details open-ended standards focused on the "doing" of science, termed competencies, which students are to reach by a given time, teachers often position the curriculum as a non--negotiable, pre-determined, product. This sets up a contradiction that needs to be unpacked, to support teachers in learning how to meet expectations for open--ended competency development through instructional practices based on methods that support development by means of inquiry-based learning.

2.2 THE SCIENCE TEACHER RESOURCE CENTER PROJECT

This study was conducted in the context of the Science Teacher Resource Center (SciTeach Center) Project. Initiated by the efforts of one of our authors at the university, and supported through a partnership between the university, the national research fund, and national education ministries, this project has three goals. First, to facilitate teacher professional development opportunities to support incorporating more inquiry- and practice-based forms of science instruction. Second, to encourage the development of a sustainable teacher network to serve as a resource for teachers. Lastly, to develop a resource center to house a collection of science teaching books and materials available for loan. Taken together, the project aims to support primary science instruction that engages students in *doing science* and learning through active instructional approaches (SIRY; ANDERSEN; WILMES, in press).

To work toward these goals, our team, consisting of two primary teachers on special assignment and three university educators, was compiled. We chose, and were chosen, to join this team because of our interest in, and experiences with, teaching and teacher professional development relative to the project goals. The co-auto-ethnography we present herein arose from our study of ourselves and our process of professional development while working toward the overall aims of the project.

An important contextual consideration in situating our work is that teachers have retained decision-making power within the regional governmental structures regarding teacher professional development policies. Schools are organized according to national regions, and administrators (referred to as "directors") of these regions, for the most part, are not able to mandate that teachers participate in particular professional development activities, outside of those mandated by the national ministries.

This has meant that teachers have retained a collective voice in the ways educational policy is implemented, and in the case of science education, it is the decision

of individual teachers and schools if they seek out professional development opportunities in science instructional approaches. Our project aim was not to work through a top-down process of teacher professional development, but rather to demonstrate for teachers how this can work in their classrooms, and subsequently, to support them in adapting their instructional approaches to those that actively engage students in science practices, yet in ways fit to their local contexts.

In this national context, and through the work of the project, we sought to examine possible opportunities for *transformation* that emerged from our collaborations around planning, development, and facilitation of professional development workshops. "We" refers to all five authors; three university researchers (authors a, b, and c) and two classroom teachers (authors d and e). Rather than continuing to reproduce the status quo in our classrooms and workshops, we utilized research in general, and co--autoethnography specifically, to shine a light on transformations that took place in our collaboration. As such, the research we present herein is two-fold, as we examine our roles and participation as professional developers of other teachers, as well as from a perspective of our own roles as teachers. To distinguish us from teachers participating in our workshops, we refer to ourselves as *workshop facilitators*, in contrast to workshop *teacher participants.* The two classroom teachers in the role of workshop facilitators are released from classroom duties one day per week to collaborate at the university. The remaining weekdays they are elementary teachers. This model was intended to enable developing identities as professional developers linked to the university context, while still retaining well--established identities as classroom teachers. Combining multiple perspectives enriches our work and facilitates our development as teachers *and* researchers, given that both identities benefit from each other.

3 THEORETICAL FRAMEWORKS

This study is grounded in critical theoretical perspectives and draws upon co-autoethnographic methodologies, as will be elaborated next.

3.1 CRITICAL THEORETICAL PERSPECTIVES

Guided by critically grounded theoretical perspectives (FREIRE, 1968; GREENE, 1995; KINCHELOE, 2008) we seek to create structures in which participants enact new roles and take agency for their own learning. The perspectives that we adopt position agency and structure in a dialectical relationship (SEWELL, 1999). As such, we examine the structures that are in place in a given context and the ways in which these mediate the agency a person can take. In turn, given the dialectic nature of structure and agency, we also consider the ways in which taking agency mediates the structures at hand.

Thus, rather than bringing in outside experts to deliver professional development (as is more typical in our national context), the project has been developed so that university researchers work with teachers to develop expertise, in order for them, in turn, to be positioned to lead workshops for other teachers.

A guiding framework that is complementary to the focus on agency / structure is the construct of teacher reflexivity, in which teachers engage in a process of dialogue and reflection with a direct focus on reflecting on past events to make changes in praxis moving forward (i.e., SIRY). We sought to support multi-perspectival reflexivity among the team, with the hope that we each developed new perspectives as well as an awareness of our own professional development and appreciation of the diversity of our perspectives.

We explored interactions between reflection, dialogue, and action, to gain new understandings of the learning and possible transformations experienced. Freire (1968, p. 126) has posited that praxis, the intersection of education and theory, is "reflection and action directed at the structures to be transformed", and this is grounded in a dialogic process in our own work. As such, we examined the role of the structure of dialogue, reflection, and action (SCHOR; FREIRE, 1987) that we engaged in collectively through a research process of co-autoethnography to examine how, and what, we learned by doing; i.e., by collaboratively facilitating professional development workshops and engaging in reflection, dialogue, and action throughout this facilitation process.

3.4 COLLABORATIVE AUTOETHNOGRAPHY AS THEORY

Collaborative autoethnography (co-autoethnography) is a qualitative methodology founded in an entwinement of both ethnographic and autobiographical theoretical approaches (CHANG; WAMBURA NGUNJIRI; HERNANDEZ, 2013). While grounded in ethnographic methodologies that support the exploration of self in a social and cultural context, autoethnography is a theoretical approach in its own right that allows researchers to "transcend narrations of the past" (CHANG; WAMBURA NGUNJIRI; HERNANDEZ, 2013, p. 19) and work toward *interpretation* of the self, relative to specific social and cultural contexts. Collaborative autoethnographic research builds upon autoethnographic approaches in ways that incorporate more than one author/voice.

Thus, co-autoethnography allows for a "merging of multiple voices to tell a collective story" (CHANG; WAMBURA NGUNJIRI; HERNANDEZ, 2013, p. 128). Yet while supporting the development of a collective story and interpretation, co-autoethnography affords researchers the space to maintain individual voices throughout both the story and the research process. Chang, Wambura Ngunjiri and Hernandez (2013) explain that co-autoethnography is grounded in four key theoretical positions: it is a focus on the self, it is embedded in a specific context, it requires visibility of the researcher, and at its core it is critically dialogic. Co-autoethnography allows for the exploration of interpersonal and intercultural aspects that arise from research traditions grounded in critical, interpretive, postmodern, postcolonial and performative theoretical perspectives (BOYLORN; ORBE, 2014).

The use of co-autoethnographic approaches has been on the rise, and studies explore a wide range of socially and culturally embedded positions that Chang and other authors (2011) describe as existing on a continuum from analytic to evocative. While the introspection and sharing of interpretation with one's own and collective voice through collaborative autoethnography has been realized in a number of past studies (KRESS; LAKE, 2017), and many of which have examined initiatives at the university level (KRESS; O'SHEA et al., 2011), we do not know of a co-autoethnographic study conducted with teachers involved in designing primary teacher workshops, and specifically in the context of science education.

Thus, this research has the potential to provide new knowledge to the field of educational research, especially as regards the ways in which teachers develop their expertise for teaching other teachers about the praxis of science education. Next we introduce the research approach that was used, with a focus on the theoretical supports provided through critical lenses.

4 METHODS

Co-autoethnography as a methodological approach allows for exploring self in relationship to social and cultural phenomena (COIA; TAYLOR, 2009; ELLIS; BOCHNER, 2000). Through a systematic research process, co-autoethnography affords advancement of social understanding by giving voice to personal experiences (WALL, 2008). It is a mode of inquiry that provides space for participants, in this case us, as educators with multiple roles (teachers, professional developers, university researchers), to explore one's voice and positions (PARK; WILMES, in press).

The participants in this co-autoethnography are the five co-authors of this manuscript. We are two classroom teachers and three university researchers. Each of us had a different professional path and different perspectives relative to our own learning of science, and views of how science might be taught in primary schools. In this manuscript, we focus our analysis on the two classroom teachers, Authors D and E, and examine the role of reflection / dialogue / action on their professional development as workshop facilitators. Author E is an early primary school teacher who currently works with 4 to 6 year-old students and has experience teaching younger children as well. She has 21 years of teaching experience and has attended a wide range of professional development activities, and is trained in family systems therapy.

This project was her first opportunity working to develop teacher professional development for other educators. Author D is a primary school teacher with

ten years of teaching experience working with students ages eight to twelve years-old. She has taught in formal classroom settings, and also in informal contexts, as she works as an outdoor educator with students of all ages. Co-autoethnography supported exploring our learning and evolution as workshop facilitators, to work towards a multi-perspectival reflexivity and possible transformation of praxis.

As we journaled about our experiences, we also engaged in dialogic exchanges with the intention of reflectively 'looking back to look forward'. This provided spaces to individually explore positions, thoughts, and orientations toward the teaching of science and working with students and teachers. Individual journaling then served as the basis for collaborative analyses. The guiding research questions were;

> • Which learning experiences and structures served to facilitate new understandings of self?
> • How did these new understandings of self mediate taking agency for our own learning and the learning of others?

Processes grounded in reflection, dialogue, and action led to numerous data resources drawn on in three layers: 1) We each wrote *descriptive-realistic* reflective journal entries about experiences as teachers of science and facilitators of professional development in response to collective prompts (Chang et al, 2013) (APPENDIX 1), and engaged in dialogue around our written responses, 2) Planning and debriefing sessions were audio- and video-recorded, and 3) Video recordings of the workshops themselves served as points of connection for further reflection. Recordings highlighted aspects that might have otherwise passed unnoticed, to serve as further points for writing and reflection (i.e., layers 1 and 2 of the data sources become complexified).

The range of different sources (written, video, audio) allowed for continual re-examination through multiple points of reference regarding the phenomena identified. From these data sources, preliminary themes were identified for further analysis, and through the analytic process two central claims emerged.

5 RESULTS

Two claims emerged from our co-autoethnographic exploration related to our professional development built upon a reflexive structure incorporating a cycle of reflection-on-action and action-upon-reflection. In the interest of brevity we highlight claims related specifically to the professional development of the two of us that are classroom teachers and workshop facilitators.

a) The ongoing process of reflection, dialogue, and action facilitated changes in perspectives and positionings toward the curricula

The facilitators gained new perspectives of having a level of expertise that was not expressed before this project, and a developing praxis as teachers of science and as researchers. Author D wrote "*I have become interested in doing research myself, and to analyze my own work as a teacher through new lenses as a researcher*". Author E and Author D discussed the implications of gaining new perspectives through the praxis-oriented focus of the project, as Author E reflected, „*I feel inspired from new perspectives on how to structure my teaching. It is a definite change in my practice*".

Building on this, Author D reflectively considered her own positioning and changed perspectives of self, "*I believe in my own competence now and am more self-confident. I have a different perspective on my work, and call into question more things than I did before*". This new and different sense of self impacted our positionings towards curricula, as Author D elaborated "*It has really surprised me that I have gained so much on strength and security, especially as in the past I have always felt insecure about the things I have done in my life. It surprised me also, that I now see myself as a resource person*". This new sense of self that Author D writes about is one which sheds light on the resources each person brings to collaboration, including ourselves.

Through the collaborative autoethnographic exploration we identified structures that supported these perspectives, including collaboration and ongoing dialogue with the team. The journaling coupled with

reflective dialogic exchanges with each other became central to our own professional development processes. As Author D wrote,

> I think that the most important thing that brings us success is that each of us is very different, with different strengths and weaknesses, while we are all very motivated to guide the project to success. This way we complement each other well, which is important for our work.

Reflecting on these differences individually as well as collectively through the process of research has highlighted the ways in which difference can serve as a resource.

b) Multiple roles mediated multiple identities and perspectives, and when coupled with the collaborative reflective process, led to taking agency and adapting curricula.

The multiple roles we engaged in, and the fluidity between these, mediated a diversity of identities and perspectives. Author E explained her initial feelings of *"fear and uncertainty about working with new colleagues, coupled with curiosity to try something new [becoming a workshop facilitator for other teachers]"*. She continued reflecting upon ways in which "*the mixture of being a teacher and researcher is enriching [to her praxis]*". The process of reflection, dialogue, and action spiraled, and our collaboration supported an ongoing awareness of our roles and identities.

Author D reflected on this process and the mediation to her own identity, as she wrote "*My professional self has definitely changed, as I now feel more drawn to science as I was before, as I also now teach almost only science. I feel like a pro in that field, and I have even more fun in my job as before [the project]*". In addition to her sense of self and relationship to science, Author D's reflection refers to greater enjoyment as a teacher, which was a perspective echoed by Author E, *"The enthusiasm for my work as a teacher. Working at the university makes me much more aware of the importance of the teaching profession"*.

Author Es journal entry after the first year elaborated how the structure of the project mediated taking agency as a workshop facilitator and teacher of scien-

ce. *"To be a part of the team has helped me put aside my initial insecurities regarding my abilities to implement science in my classroom I now try new things [as a kindergarten teacher] and am impressed with my students' enthusiasm."* The critical adaptation of curriculum materials is a valuable perspective that situates curriculum as fluid and adaptable, not static and firm.

> It is a kind of pioneering work in the Luxembourg school system to get inquiry learning across to other teachers, especially teachers who have not learned this during their studies. Since I myself am one of these teachers and until a year ago I did not know what the word "inquiry" means, I see it as a challenge to convey to the teachers my enthusiasm for this, for me new, lesson design.

Being perceived as an expert and someone who offers resources regarding didactics and methods in science education is something that Author D mentioned as well, *"My relationship with my colleagues has changed so much that they now see me as a resource person and often ask me for ideas. They are all very excited about my lessons and some are setting an example"*.

Both claims that arose from our analysis build upon each other and are interrelated. This was/is an active process, supporting a critical comprehension of ourselves (SCHOR; FREIRE, 1987). A fluidity in the different roles created spaces to develop our orientations towards teaching science and teaching teachers. Author E sums up the interconnections whereby the cycle of reflection, dialogue and action impacted her sense of self as a professional development facilitator, and how it then influenced her teaching practices: *"I think it is a positive development for my students when they have opportunities to investigate for themselves and not only passively receive information I selected for them"*.

She explained that this way of teaching helped her students find their own voices, taught them how to show respect to each other, and made them feel valued, all of this working toward building a culture of respect in her own classroom. As we each developed critical awareness through reflection, dialogue and action, there was a radical interaction between these processes to support views on learning as problematization (SCHOR; FREIRE, 1987).

6 DISCUSSION AND IMPLICATIONS

Raising awareness of our own professional development through the process of collaborative auto-ethnographic research has situated us to be able to examine the structures that have mediated our own transformations, and in doing so, we hope to continue the awareness raising process in order to begin to work towards transforming structures for ourselves as well as our teacher education participants. Key structures identified that have been instrumental for the changing of perspectives and understandings as well as the taking of agency, include as follows:

1) Space and time to collectively dialogue, reflect, and take action. Specifically, meeting every one to two weeks throughout the school year;

2) Flexibility to try things out in the classroom. Both Authors D and E used the science instructional approaches in their classrooms before working with teachers to use them in professional development, providing them with personal experience to ground their support of other educators;

3) Reflection embedded into our collaboration from the start of the project. This was done at a minimum every six months for the entire duration of the project and provided a trajectory of reflection throughout the project.

Summing up, the following can be highlighted: Through the use of critical self-reflexive and dialogic research methodologies, we work toward and hope to achieve critical consciousness and thus position ourselves and others to unpack and analyze existing hegemonic structures in order to ideally transform them and work towards more equitable and ethical research and teaching praxis. The process of conscientization extends throughout both claims above, as we work towards facilitating a critical awareness through reflection, dialogue, and action. Action is a key part of working towards shifting structures in the educational process in order to move towards transformation and more equitable praxis.

In the reshaping of professional identities, critical pedagogical perspectives impact an awakening within the self that shifts the ways in which we position ourselves, and are positioned by others. Our perspectives changed, and continue to change, as we move back and forth between teacher, research team member, and professional developer. This highlights a value in creating structures for teachers to reflectively and reciprocally work as professional developers and teachers, across multiple layers of schooling (i.e., in collaboration with the national structures, the university, in local classrooms).

Through this study, we aim to contribute to research literature on teacher professional development through critical theoretical methodologies and our interpretation of experiences in our unique national context which have applications for a wider audience. We are currently working within a context where there has been a national mandate in support of specific forms of science instruction at the primary level. Our work strives to support teachers to adapt instructional approaches to align with the national mandates, in ways adapted to their local contextualized classroom needs. While this policy and practice situation is specific to our context, we feel it speaks to many educational systems. In many international contexts, neoliberal mechanisms of conformity and profit are evident forces impacting STEM education (BAZZUL, 2012, BENCZE; CARTER, 2011).

For example, in our work we are often confronted with a dominant discourse that emphasizes teacher "training", and in turn we are encouraged to, "train the trainers." The term "training" is one that we take issue with, as it is aligned with a banking approach of education (FREIRE, 1968), which "reflects, reinforces, legitimizes, and replicates those social, political, and economic structures and relationships of domination that rendered people powerless" (KREISBERG, 1992, p. 8). We seek to push back on such dehumanizing approaches, as we believe and hope to underscore through our work that it is through collaborative, reflective, dialogic interactions that one can develop as a professional.

In short, our work utilizes and builds upon methodologies grounded in individual and collective voice to support teacher professional development in ways that honor voice and locally contextualized practices. We have sought to "step out of the academic brew" (KRESS, 2011, p. 267) with dialogic research in order to work

towards a reflexive pushing back on hierarchical structures. In particular, autoethnography, "in which writers construct and reconstruct their fluid understanding of connections between their personal lived experiences and the social cultural structures" (YAZAN, p. 7) has highlighted this aspect. "Dialoguing about agentic possibilities allows people to see the humanity within each other, to critically understand the world, and to engage in cultural work that might bring about new group understandings and action" (MAGILL, 2017, p. 41).

7 CONCLUSION

This manuscript connects to the special issue's focus of critical pedagogy and educational research as we use critical theories and methodologies to highlight roles we each played in our research to support equity in professional development processes. Learning to teach is "a long-term, complex, developmental process that is the result of participation in the social practices and contexts associated with learning and teaching" (JOHNSON, 2009, p. 10). Within this process we have collaboratively reflected on how to support teachers, and ourselves, in taking agency and we examine multilayered roles that developed new processes and perspectives. Our co-autoethnographic process has revealed how reflection, dialogue, and action supported us in realizing the multiple positions and perspectives we each hold relative to the process of teacher professional development.

Meaning, we each came to this process along different trajectories grounded in pathways through the field of education, trajectories which all intersected in project we describe herein. At this intersection, and from our different perspectives, we each approached our work together to develop workshops in ways that supported each other in working from our individual strengths to support teaching approaches related to the new curricula. In recognizing the collective strengths of our group as well as the inherent differences in what we each know and have experienced, we also identified our own individual incompleteness. "Women and men are capable of being educated only to the extent that they are capable of seeing themselves as unfinished. Education does not make us educable. It is our awareness of being unfinished that makes us educable" (FREIRE, 1968, p. 58).

Through our work together as educators, we seek to provide safe spaces for a multitude of voices. We do this in two ways. First, through spaces created for teachers to dialog, reflect, and take action, and second, through the use of methodologies to support reflective spaces. "Collaborative autoethnography holds promise and potential as a critical method for fostering global collaboration that disrupts hegemonic theorizing" (HERNANDEZ; CHANG; NGUNJIRI, 2017, p. 253) as it provides spaces for exploring multiple voices in places where there typically is no room to critically question.

In our case, it is a research process that supported multivocality, and in the context of a national science education initiative, allows us to build on an approach of "power sharing in the research process (in order to invite) people who might otherwise be in hierarchical relationships to become part of a mutually enriching process" (HERNANDEZ; CHANG; NGUNJIRI, 2017, p. 253). The value of our roles and the motivation emerging from these as teachers, researchers and professional developers has become key to considering how to work towards equity as we engage in collaborative research methods for achieving multi-voiced, equitable praxis that highlights our own professional development.

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Appendix 1 - Sample reflective journaling prompts

Beginning of first project year
Autobiograhical experiences with science - What can I recall from my childhood / youth?

Before first workshops were offered
1. How do I feel about the objectives of the workshop as outlined in the description?
2. Which other objectives would you like to suggest?
3. What are the personal workshop objectives that you would like to achieve?
4. Which materials and resources should we also give to the teachers?

Middle of first project year
1. What are my personal goals for the workshops?
2. Which structures support the project effectively?

Beginning of second project year
1. What are the structures that supported the project? What were some successes and challenges?
2. How did we grow? What enriched the process? Where am I now?
3. What are your personal goals for this next year?
4. Which structures support the project effectively?

Middle of second project year
1. How would you describe your current lesson design compared to the one at the beginning of the project? If it is helpful, look again at your previous reflections. How do you feel today compared to the beginning of the project? Do you notice any changes in your professional self? In the workshops? To teach in your way? In relation to your fellow teachers? Is there something that has not changed?
2. Which of your potentials have you not been able to bring in yet?
3. Optional: Was there anything that surprised you? If yes, please explain.

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