

THE PROFESSIONAL JOURNEY OF BEATRIZ SILVA D'AMBROSIO: A MATHEMATICS EDUCATOR

Celi Espasandin Lopes ¹

Universidade Cruzeiro do Sul

Jane Keiser ²

Miami University

“Joy does not emerge solely from discoveries, it is also part of the quest. Teaching and learning cannot take place outside this pursuit, cannot be separated from beauty and joy.”

Paulo Freire

ABSTRACT

The present article presents a discussion about the career of Beatriz Silva D'Ambrosio (Bia). Not all of her work is listed here, but only the part of her production highlighted by Academic Google. The objective is to give the reader an overview of Bia's professional legacy. It shows the course of her professional development and her contributions to the literature in the fields of Education, Psychology and Mathematics Education. Some of the texts co-authored in collaborations with colleagues are also discussed. The quest for continuous dialogue with peers, her commitment to the development of research to improve the teaching and learning of mathematics, as well as her commitment to ethics, social justice and community of practice hallmarked her career as a mathematics educator, teacher educator and researcher.

Keywords: Mathematics Education, research, professional path, professional development, scientific production.

¹ celi.espasandin.lopes@gmail.com

² keiserjm@miamioh.edu

Beatriz Silva D'Ambrosio was born on January 26, 1960 in the city of São Paulo, São Paulo State, Brazil. She learned how to read in English, while living in the United States where she attended Elementary and Middle School.

At age 20, Bia, as her family and friends called her, majored in mathematics at the Institute of Mathematics and Statistics (IMECC) of the State University of Campinas (UNICAMP). Because she had prior employment with an educational institution for children who were considered as having learning difficulties, Bia began wrestle with the many obstacles children seemed to have in learning mathematics. While still completing the coursework, she began to wrestle with the difficulties children seemed to have with mathematics. She worked for two years in an educational institution for children considered to have learning difficulties.

Bia was now a licensed teacher and wanted to better her own mathematics education, as she continued to do throughout her life. At that time, mathematics education was not yet a well-established field of study in Brazil, so Bia decided to return to the United States to complete her graduate studies.

In 1981, accompanied by her father, she visited many educational institutions in search of a graduate program in mathematics education. At the time she was introduced by Dr. George Springer of Indiana University's (IU's) Department of Mathematics to Dr. Frank Lester of IU's School of Education, who would later become her doctoral thesis advisor. Dr. Lester recalls that Bia was very shy and that in their first contact, they talked about the ideas of Piaget, as well as the work of Hans Freudenthal. Dr. Lester explained that after just one conversation about studies on children's learning of mathematics, he offered Bia the opportunity to study at Indiana University (IU), Bloomington, and to do research on how to apply the theoretical work of Piaget and others to research the problems of teaching and learning mathematics. So, in the words of Lester (2015), "Bia studied for six years in Bloomington and came to be an excellent mathematics educator."

Bia graduated with a doctorate in Curriculum and Instruction with a Cognate in Mathematics in 1987 and published her dissertation: *The dynamics and consequences of the modern mathematics reform movement for Brazilian mathematics education*. The contribution of that study was not limited to research in mathematics education,

but showed significant evidence of the need to rethink teacher education as well as significant revision of curricular guidelines. Bia considered that,

with respect to the mathematics curriculum in Brazil, the results include a historical account of the development of the Brazilian curriculum over the past 25 years. Social, cultural and political forces that helped shape this curriculum are discussed and the study serves to illustrate the importance of taking into consideration such forces in the transfer of educational innovations from one country to another. Also, the lasting influences for Brazilian education of the curriculum innovations of the '60s are elucidated. Finally, the study includes a list of recommendations for curriculum innovations in the future. (D'Ambrosio, 1987, p. ix)

In the article *The Modern Mathematics Reform Movement in Brazil and Its Consequences for Brazilian Mathematics Education* (D'Ambrosio, 1991), she discussed issues arising from her doctoral research and described the dynamics of the Modern Mathematics Movement, and its consequences for the Brazilian educational system.

The movement is studied as to how ideas about modern mathematics reform were disseminated to the Brazilian mathematics education community and the consequences due to misinterpretations of the intended curriculum in the implementation process. The intent of the study is that future initiatives in curriculum change proceed more efficiently in light of previous experiences, without repeating the mistakes committed in the past. The past thirty years have been an era of great changes in mathematics education throughout the world. For the developed countries it has been a period of creative activity in curriculum development. For many developing countries it has been a period of uncritical adoption of foreign ideas about the mathematics curriculum. For other developing countries, Brazil in particular, it has been a period of adaptations of foreign ideas to national curricula and local educational policies. (D'Ambrosio, 1991, p. 69)

With the analysis of the consequences of the Modern Mathematics Movement for Brazilian mathematics education Bia was raising a red flag, meant to call attention to the teaching and learning processes, and particularly to the development of future proposals for mathematics curricula. In the article she pointed out that

the new language incorporated into the teaching of mathematics was often incorrectly used in the textbooks. For example, the number-numeral distinction was often abused. Students were required to distinguish between numbers and numerals in lists of exercises, but in subsequent chapters in the textbooks the authors themselves ignored the distinction and confused the terms. Translations from English generated a few misconceptions as well. For example the place-holder was translated to "*quadradozinho*" [little square] instead of being called a

box or place-holder. Consequently, its meaning and purpose of being filled by a number was totally lost. Instead it simply replaced the common representation of unknowns, such as "x." With respect to methodology, the activities approach was misconstrued and indicated to teachers that children should learn through play. The extent of this problem was such that time for play was increased but teachers often continued to teach as they had done previously. The materials purchased and developed such as Dienes' multi-base blocks were used for unstructured play rather than for mathematics instruction. (D'Ambrosio, 1991, p. 78)

She returned to Brazil, in the same year she published her dissertation, as a visiting professor at the Pontifical Catholic University (PUC / SP) and assisted in the process for the recognition of mathematics education as a scientific field of research in Brazil. In the following year, she was hired as a professor at her alma mater, the IMECC of the UNICAMP, where she contributed to the preservice and in-service education of mathematics teachers. She believed that teacher education should bring forth professionals who were critical of their own actions and aware of their future responsibilities (D'Ambrosio, 1993, p. 6).

While studying at IU, Bia took part in several research projects involving teachers and children. In 1989, in Brazil, she published an article through which she discussed the teaching of mathematics, and shed light onto dilemmas still present in the mathematics classroom to this date.

In general, teachers present Mathematics as a finished and complete body of knowledge. Students do not get the chance or need to create anything, not even a more interesting solution. Thus, the students are led to believe that their role in the mathematics classroom is passive and uninteresting. A major concern for teachers is the amount of content covered. For most teachers, the priority of their pedagogical practice is the amount of content that must be covered, not students' performance. It is rare to find a teacher who is convinced that the main objective of the educational process is that students achieve their best possible performance; and it is hard to achieve such an objective when the goal of the teacher is to cover the largest amount of content possible during classes. In this process, there is not a single moment when the situations created call for students to be creative, or motivate students to solve problems, as a result of curiosity for the situation or a challenge. School mathematics does not create situations for investigation, exploration and discovery. The process of mathematical research is restricted to a few initiated individuals who take it as their object of study. It is this research process which enables and fosters creativity while working with problem situations. (D'Ambrosio, 1989, p.2)

In the same year, the Brazilian educational scene would lose Bia again, now to the School of Education of the University of Delaware, in Newark. During her professional journey in the United States, she worked as a professor and researcher at the College of Education of the University of Georgia; at Indiana University; at Indiana University–Purdue University, Indianapolis and, finally, at Miami University, Oxford, Ohio, where she worked in the last ten years of her life. During this 26 year span of time, Bia contributed a lot to U.S. research in mathematics education. From 2006-2009, she served on the Board of Directors of the National Council of Teachers of Mathematics (NCTM).

Throughout her career, Bia consistently contributed to the Brazilian scientific production in mathematics education. She participated in research projects, in collaboration with Brazilian researchers; mentored students, as well as collaborated with lecturers who took part in graduate and internship programs in United States. She worked in Brazil, in several institutions, as a visiting professor; she participated in numerous Brazilian scientific events; and many researchers enjoyed the privilege of her contributions in numerous master and doctorate dissertation evaluation panels.

Bia diligently participated in editorial committees and collaborated with several international publications as a reviewer. She was always willing to contribute for the development of the research in Mathematics Education and believed that “Our goal should be to help create a generation that is way better than we are, a generation of people who can reinvent themselves, rather than creating replicas of ourselves.” (D’Ambrosio, 2014, p.3). She claimed that

school today does not help children enough to exercise the responsibility to create a better world for themselves and future generations. To reach this noble goal, which our generation failed to achieve, children will have to be able to work together to creatively solve serious social and economic problems, and create mechanisms to preserve the world's natural resources, which will sustain future generations of humanity. (D’Ambrosio & Lopes, 2015c, p. 273)

Since the 80’s Bia advocated the importance for teachers to implement a dynamic for the mathematics classroom that would create an environment in which students could propose, explore and investigate mathematical problems.

New teachers must view Mathematics as a field of research; a field whose advances are a consequence of the investigation and problem-solving process. In order to create a mathematical research

environment, where curiosity and stimuli are the students' intrinsic motivator, it is necessary to modify classroom dynamics. Work groups are necessary as they emulate the mathematical research community. The teachers are no longer the highest authority but become members of a work group. A lot of what is observed in students' investigation will be new to teachers. Their contribution to the work will be their view of what constitutes mathematical activity, and in particular what constitutes problem definition and solution. In some instances, the teacher identifies an area that needs work and proposes problems to be investigated. Other times, the teacher puts forward contexts that can be real, ludic or mathematical, from which problems are derived and solved. (D'Ambrosio, 1993, p.3)

In 1995, she discussed her understanding of what would be a “constructivist teacher” in a collaboration with Leslie Steffe.

We called teachers who study the mathematical constructions of students and who interact with students in a learning space whose design is based, at least in part, on a working knowledge of students' mathematics “constructivist teachers,” and the activity in which they engage “constructivist teaching” (Steffe & D'Ambrosio, 1995, p. 148).

For Bia, the idea that when faced with a problem situation, people can find solutions based on the knowledge that they have already developed, is at the core of radical constructivism. As a constructivist educator, she believed that it is essential to ensure that students had mastered the concepts necessary for the creation of procedures that would lead to a solution in the situation investigated. And how can one do that, Bia?

The starting point for mathematical knowledge is what the student knows well.... So, knowing students' history is the most important task of the teacher, the history of the students and their mathematical background.... Therefore, a constructivist teacher must be a researcher; observant of what the students bring that can be employed as class material. (Brião, 2015, p.7)³

She believed that working in groups was potentially beneficial, as it stimulated debate and the comparison of ideas from individual perspectives, as well as enabled the collaborative construction of knowledge.

Based on these assumptions, she sought a better understanding of the processes of learning and teaching mathematics in her investigations. In association with Anderson, she analyzed

³ Gabriela Brião interviewed Bia in May 2015.

students' mathematical development that occurs as a teacher works within each of 2 zones of learning: students' zones of proximal development (ZPD) and students' zones of potential construction (ZPC). ZPD, proposed by Vygotsky, is grounded in a social constructivist perspective on learning, whereas ZPC, proposed by Steffe, is grounded in a radical constructivist perspective on learning. (Norton & D'Ambrosio, 2008, p. 220)

Her actions and inquiries also showed her concerns about issues related to equity and social justice. In 1997, in collaboration with William Tate, she edited volume 28 of the *Journal for Research in Mathematics Education*, "*Equity, Mathematics Reform, and Research: Crossing Boundaries in Search of Understanding.*" In this volume, she co-authored with Murtadha-Watts the article, "*A Convergence of Transformative Multicultural and Mathematics Instruction? Dilemmas of Group Deliberations for Curriculum Change.*" In this work they described their collaborative efforts to produce a multicultural mathematics curriculum for Grades K-6. They discussed ideas about multicultural education, socially proactive mathematics, and preservice and in-service teacher deliberations. Through group deliberations, the analysis of existing mathematics and multicultural curricula, and the sharing of personal histories, they planned teacher-research activities. They defined mathematics as a tool for social analysis and they described the perplexity of issues related to the definition of multicultural curricula and mathematics curricula for social transformation, the complexities of the group deliberative process, and the demands involved in the teacher-researcher process. They defended the need to reconceptualize and produce a curriculum for K-6 mathematics that is culturally rich and portrays mathematics as a tool for critical social analysis (Murtadha-Watts & D'Ambrosio, 1997).

Bia always advocated for the concept of teacher-researcher. In 1992, she was a guest editor of a special "Teacher Research" issue of *The Mathematics Educator* journal when she stated that

By learning more about students' thinking and understanding of mathematics, teachers can enhance their own understanding of students' thinking, as well as play an active part in the mathematics education research community by providing insight into the understanding of students' learning of mathematics. (D'Ambrosio, 1992, p. 1)

She always viewed teachers as creators of knowledge. She co-authored, with her father, an article entitled, *Formação de professores de matemática: professor-pesquisador*, in which they demonstrated the relationship between research and classroom work and established strategies which associated practice and research.

when teachers start to “listen” to their students; they give them a voice, empowering them to take ownership of their learning process. Such teachers come to view the students’ thought processes as guidelines, which direct their goals as well as steer their decisions regarding curriculum and methodology. The willingness of teachers to listen to their students, in order to give them a voice and empower them, is a hallmark of a teacher-researcher (D’Ambrosio, 2002). Such teachers collect data derived from their students’ production, observations of students’ behavior, as well as conversations with students, and analyze everything, in order to understand each student’s learning history. (D’Ambrosio & D’Ambrosio, 2006, p. 79)

Bia’s academic production progressed as a spiral of reflection; she always considered her actions both as an educator and a researcher. In her investigations, the awareness of others, marked by her sensibility, as well as her professional and personal maturity, interlaced with the search for new methodologies allowed her to expand the ways to view, hear and think about teachers and students, thus finding new truths.

In the article, *Preparing teachers to teach mathematics within a constructivist framework: The importance of listening to children*, Bia discusses the three forms of listening that can be found in mathematics classrooms, which are essential for a constructivist teacher. They are *evaluative listening*, *interpretive listening* and *hermeneutic listening*.

Evaluative listening is the type of listening used by teachers who use the **voice of the discipline** in interpreting children’s mathematical understanding. This teacher knows the rules and logic of mathematics and questions the child to search for errors in the child’s thinking. I contend that evaluative listening is not sufficient to help the teacher build a model of the child’s mathematics. **Interpretive listening** is the type of listening that uses the **voice of the child** in interpreting the child’s mathematical understanding. This teacher listens to the child and tries to put themselves in the child’s place, asking, “How might I be thinking about this if I had had some of the same experiences?” The teacher who is an interpretive listener attempts to make sense of what the child says or does. This teacher strives to give reason to the child. [...] I propose that **hermeneutic listening** is the type of listening used by the teacher who integrates the **voice of the child, the voice of the discipline**, and **her inner voice** in order to build a model of the child’s

mathematics. Hermeneutic listening is a form of listening in which all parties involved in the interaction undergo some change. (D'Ambrosio, 2004, p. 139 -140).

Based on such definitions, Bia states that “a constructivist teacher is one who uses hermeneutic listening to integrate the multiple voices that emerge during an instructional episode” (D'Ambrosio, 2004, p. 140).

In the 90's, Bia's focused on investigating how to bridge the gap between research and practice.

I discuss the importance of teacher research in bridging the gap between research and practice. Then I examine the parallels between the act of learning and the act of researching and the use of practitioner research in developing K-12 mathematics instruction that is more constructivist in nature. (D'Ambrosio, 1997, p. 144)

The interests of D'Ambrosio as a researcher were always focused on children's learning, problem solving, curriculum, and the use of games for teaching mathematics. This perspective has directly influenced at least two Brazilian researchers, Lopes and Grando, who recently discussed problem solving in early-childhood. They discussed

the importance of problems in early childhood education for the child's development and engagement with the mathematics existing in childhood culture. Our assumption is that an important task for young children's education is to create a democratic and critical environment, in which multiplicity of perspectives is celebrated, along with diversity of concepts and practices, with movement between imaginary and real worlds. In light of this, the goal of this article is to defend a perspective for curriculum and for the role of the mathematics educator, promoting the learning of mathematics through problem solving in early childhood years. In order to discuss and illustrate this perspective we describe the pedagogical practices of two teachers who teach 4-5-year-olds, who create an environment rich in problem solving and investigations for their students. In both classrooms, all children individually succeeded in sharing their unique solutions and new knowledge constructed as a result of their inquiries. The experience provides evidence that problem solving affords children the opportunity to raise conjectures, to discuss possibilities and to draw conclusions, even if partial ones, that are then vetted by the group as the authors share their solutions. In this way, the work with problem solving nurtures cooperative learning and promotes the exploration of a diversity of ideas. (Lopes, Grando, & D'Ambrosio, 2016, p. 1)

This perspective that values the mathematical thought process of the student was a constant in Bia's classes as well as her research. The constant movement of listening to and heeding the children and learners eventually led her to discuss the evaluation process.

to evaluate mathematical power, items that are situated in contexts integral to the problem are far more likely to produce evidence of connections between mathematical, practical, and other content knowledges.... The analysis presented shows that many students bring their personal and mathematical knowledges to bear on contextual items. Both elements suggest students are gaining a measure of mathematical power from their personal and educational experiences. The difficulty lies in their ability to integrate these knowledges with knowledge of content areas other than mathematics. We contend that this skill is one of the most essential elements of mathematical power. (Kastberg, D'Ambrosio, McDermott, & Saada, 2005, p. 15)

Bia's publications were notable for emphasizing the importance of empowering and listening to empowering both learners and teachers. To give a voice was also to "give reason" (Duckworth, 1987) to the learners, which

entails the ability to honor and respect the reasons given by a student. It should not be confused with "giving kids reasons", meaning to explain things to a learner in the hope that they will absorb the teacher's explanations. In mathematics teaching, giving reason to the learner would mean considering the mathematics learner as a mathematical thinker with a system of knowledge that is internally consistent. (D'Ambrosio & Kastberg, 2012, p.22)

"Giving voice" to the learners seems quite in line with what is known about Bia; her theoretical and methodological beliefs. However, her professional consistency reached further, as her position in relation to the voice of prospective teachers was similar:

Giving reason to the prospective teachers would mean acknowledging that competing views of good teaching are viable and exist in our own learning space of teacher preparation. These contradictory and competing understandings are silenced in our teaching environment by our unconscious actions. These actions include daily choices we make for readings and discussion questions, our inattention to prospective teachers' views of teaching and learning, and avoidance in addressing prospective teachers' competing views of good teaching. (D'Ambrosio & Kastberg, 2012, p.23)

By addressing investigative perspectives about teaching and learning, Bia treaded paths that intertwined—at times analyzing child development—at times looking into the professional development of teachers—and sometimes focusing on both processes.

All learners make sense of new experiences using existing knowledge and an understanding of the demands and goals of the situation at hand. For teachers this often means that in looking at student reasoning, they may initially see what is missing (or compare student

solutions to their own) rather than making sense of the reasoning that is shared.... Analysis of student work allows teachers to build connections between their own reasoning and the reasoning of students, resulting in a teachers' mathematics learning. (Kastberg, D'Ambrosio, & Lynch-Davis, 2012, p. 36)

Bia explored those ideas further, and in an article entitled, *O professor-pesquisador diante da produção escrita dos alunos*, she established the theoretical basis to justify students' writing as informative material for teachers.

The radical constructivism of von Glasersfeld (1990, 1991) is used as the theoretical framework that justifies the use of student writing to inform teachers. The constructivist teacher is a teacher-researcher who creates models using the mathematics of their students to plan instructional activities based on these models. The teacher-researcher reads hermeneutically the writing of students, which requires a certain disposition in order to give reason to those students. The hermeneutic reading helps the teacher understand how students are constructing knowledge, as well as potentially providing the teacher with new approaches to mathematical problems. In this paper, we use student writing to describe the reading process used by a teacher-researcher who works within a constructivist paradigm. (D'Ambrosio, 2014, p. 249)

Another hallmark of Bia's career was no doubt her firm belief in collaborative work. She seldom published individually, as she loved to discuss her ideas with colleagues. Her openness captivated many co-authors. Those who had this privilege, agree that it was a pleasure to work with her, as she always prioritized ethics, and methodological and theoretical accuracy.

Mathematics Education research must be bold, in order to help foster human development, empowering individuals for social actions guided by community of interests and ethical principles. In order to do so, research must take a spiral movement, reexamining the *status quo*, breaking with rules and regulations, and freely and creatively seeking new views, approaches and contexts. The academic environment sometimes defines a way of doing research that follows predetermined standards and patterns, which instead of bringing about new insights, conduces to reproduction and repetition which hinder the manifestation of new phenomena (D'Ambrosio & Lopes, 2015b, p.370-371)

Bia valued multiple methodological approaches for investigating Mathematics Education. With Dana Cox she co-authored the article *An Examination of Current Methodologies in Mathematics Education Through the Lenses of Purpose, Participation, and Privilege*, through which both authors brilliantly invite readers to reflect about their practices and face the contradictions of our identities as researchers in Mathematics Education.

From a first-hand perspective we reveal and address our contradictions, organizing our discussion around the following four questions: How do we find meaning in educational research on teaching? Who is in control of the research design and who gets to participate? How should we collect and analyze data? And for what purpose do we disseminate our work? In order to best illustrate the contradictions in our work that are related to our methodological choices, we have constructed fictional dialogues that set the stage for each discussion. These dialogues capture the triggers that forced us to change the course of our research and shaped our current thinking about the ethics of conducting classroom-based research. We end this article with an invitation for readers to help define alternative research methodologies that are respectful, ethical, transformational, and empowering for all participants. (D'Ambrosio & Cox, 2015, p. 688)

This collaborative production with colleagues was very dear to Bia. It is apparent in the publications that they were mutually inspired to tread unknown paths together and marvel at their own responsible subversions. Together they found the strength to examine their contradictions. This is evident in the article *Repositioning Ourselves: acknowledging contradiction*, in which the authors present a self-study that resulted in the awareness of discrepancies that existed between their beliefs and practices as teacher educators and educational researchers. Bia and her colleagues, Dana, Jane and Nirmala state that

The living contradiction in our teaching has caused us to question many of our typical practices as mathematics educators, especially in the role of professional development providers or math consultants to districts and schools. We want to do work that respects, maintains the dignity of our teachers, and gives them autonomy in constructing a picture of ideal practice. We have begun to acknowledge the value of co-constructing meaning alongside teachers, but need to explore models for how we can accomplish this. (Cox, D'Ambrosio, Keiser, & Naresh, 2014, p.1009)

This co-constructing with other teachers was an integral part of Bia's professional journey. In her last work this principle was manifested even further in the discussions of the narratives of mathematics educators. Bia focused her investigations in the professional path of mathematics teachers and how they were connected with the concepts of creative insubordination or responsible subversion, as defined by D'Ambrosio and Lopes (2014). For D'Ambrosio and Lopes (2015d)

the narrative is both the phenomenon to be investigated and the investigation method. Data is collected through interactive dialogue from (auto)biographic narratives. We listen attentively to the narratives, and from the testimonies of teachers, we try to identify aspects of their professional identity, which characterize them as subversively

responsible professionals.... We opted for (auto)biographic research in order to show the actions of creative insubordination of early-childhood mathematics educators, both in their professional training and practice, as an effort to promote learning and learner development. (p.4-5)

Lopes and D'Ambrosio (2015) consider that the perspective of narrative has leveraged forms of responsible subversion in research about education, and has become a strong and significant presence in scientific productions in the mathematics education scenario.

In July 2015, she published, in the United States, a book designed and organized in collaboration with the first author of the present article. Bia was very happy with the work, as it provided an opportunity to disseminate some of the Brazilian research on creative insubordination in English-speaking countries. In order to organize this book, D'Ambrosio and Lopes (2015a)

consider the premise that to dare to create and to take the challenge of investigative work requires that researchers seek the unthinkable and then become amazed by what was supposedly unattainable. Educational complexity constitutes mathematics education; and the pursuit of investigative paths that consider different ways of thinking and acting is what led us to the ideas of creative insubordination, a concept that emerged in the fields of education and health. (p. 32)

In 2014, the authors published in the journal *Bolema*, in Brazil, an article inviting the community of Brazilian mathematics educators to examine the concept of creative insubordination in their research. This gave rise to a collection entitled *Insubordinação Criativa*, coordinated by D'Ambrosio and Lopes and published by Editora Mercado de Letras.

In the first volume of this collection, published in 2014, D'Ambrosio and Lopes dialogued, through narratives, with nine Elementary and Middle School teachers about responsible subversion in their professional journeys.

To interview the teachers, listen, give them a voice, read, and read again, rewrite their journeys was sheer thrill. We were very careful to give the narratives respect, attention and reverence. The evidence arising from accounts led us to praise the nobility of work of these educators and applaud their professional attitude (D'Ambrosio & Lopes, 2014, p. 98)

This production would consolidate a co-authorship focused on examining issues related to Mathematics Education research and educational practice, through the perspective of creative insubordination, for the benefit of the learners and teachers

alike, prioritizing their needs, guiding all analyses by principles of ethics, solidarity and social justice. The ideas of Paulo Freire gave rise to several ideas which were shared by the authors and a collaborative production marked by a “persisting movement of agreeing, disagreeing, provoking, challenging and co-constructing” (D'Ambrosio & Lopes, 2014, p. 101). These joint efforts led the authors to define their co-authorship.

We indeed see ourselves as co-authors when we recognize this work “without co-authorship”. Several times we realized that one was thinking what the other was writing, or writing what the other had just thought about. In doing so, we learned what real co-authorship is. It boosts the ability to go beyond, and exceed the culmination of our individual ideas. (p. 102)

The collaborative work of D'Ambrosio and Lopes resulted in productions and publications based on the premise that

To venture into research is to explore the unknown, be puzzled by possible mysteries, and dive into unpredictable waves! To investigate is to find pleasure in discovery, confront the new, and be free to tread roads that have never been taken, or take detours along the way. This is what characterizes the boldness of those who do creative research. Diving in waves susceptible to winds from different directions, we consider the diversity of contexts in which we plunge to find evidence that will surprise us and shatter our truths. We will be led to unravel the emerging heterogeneous and complex movements defined by the time they occur. When we plunge into this sea of educational research, we choose to follow a movement that generates waves that are sometimes calm; and smooth waters that allow us to see clearly what we seek. Other times, we are faced with rough sea and murky waters that cast us into the unpredictable, and require a willingness to think anew what emerges before our eyes, and boldly read with fresh eyes new facts and unexpected attitudes. (D'Ambrosio & Lopes, 2015a, p. 31)

When turning a critical eye onto Bia's professional trajectory we can observe a progression in her scientific production, as she did not abandon the study of a theme, but rather broadened her analytical perspective on the matter she was pursuing.

Bia's exceptional journey culminated with the discussion of the concept of creative insubordination in teacher training, in the pedagogical practices of those who teach mathematics, as well as in the professional practice of researchers.

Before she died, she was involved in a project, with the first author of this text. The goal of the project was to broaden the discussion about responsible subversion of children in face of the processes which they undergo in school for learning and teaching mathematics. It so happens that “boldness in scientific work in Mathematics

Education can help promote human development which will in turn empower individuals to take social action guided by solidarity and ethics” (D’Ambrosio & Lopes, 2015b, p.370).

Bia taught us a lot about respect for children and teachers. She taught by example with her practice and her candid voice, to the point of saying, in a conference where she used her practice as a starting point, “So, let’s talk about contradictions between what we value and our practices!” (D’Ambrosio, 2014, p.4).

Her brilliance resided in her simplicity, her ability to listen to others and always value the knowledge each person had, and in her kindness. She always chose a humble presence, which showed her nobleness.

In September 2015, on a sunny Sunday afternoon, Bia was happy and excited with many interesting professional projects. Suddenly, however, Bia passed away, the victim of a brain aneurysm, her demise soft and gentle, as was her presence in our lives.

To Bia we are thankful, for her friendship, her teachings, for her kindness.

To Dr. D’Ambrosio, our gratitude for scientific production that will no doubt inspire many in the field of Education, and particularly Mathematics Education, for incalculable years to come.

To Beatriz Silva D’Ambrosio, we are grateful to you for wearing so many hats, as a friend, a colleague, a mentor, a professor, a researcher; and when our paths intertwined, we had the privilege of knowing an exceptional human being.

You can go now

For there are many paths to tread

Many hearts need love

Many men need peace

Many people need compassion

Many children need smiles and affection.

REFERÊNCIAS

- Brião, G. (2015, junho). Conversa com a educadora matemática Beatriz D'Ambrosio: uma construtivista radical. *e-Mosaicos. Revista Multidisciplinar de Ensino, Pesquisa, Extensão e Cultura do Instituto de Aplicação Fernando Rodrigues da Silveira (Cap-UERJ)*, 4(7), jun. Retirado em 15 de fevereiro, 2016, de <http://www.e-publicacoes.uerj.br/index.php/e-mosaicos/article/view/17112/12582>.
- Cox, D., D'Ambrosio, B., Keiser, J., & Naresh, N. (2014, agosto). Repositioning ourselves: acknowledging contradiction. *Bolema*, 28(49), 990-1011.
- D'Ambrosio, B. S. (1987). The dynamics and consequences of the Modern Mathematics reform movement for Brazilian Mathematics education (Tese de Doutorado). School of Education, Indiana University, Bloomington.
- D'Ambrosio, B. S. (1989). Como ensinar matemática hoje? *Temas e Debates – SBEM*, ano2(2), 15-19.
- D'Ambrosio, B. S. (1991). The modern mathematics reform movement in Brazil and its consequences for Brazilian mathematics education. *Educational Studies in Mathematics*, 22, 69-85.
- D'Ambrosio, B. S. (1992). Editorial: Teacher research. *The Mathematics Educator (TME)*, 3(2), 1-3.
- D'Ambrosio, B. S. (1993, março). Professores de Matemática para o século XXI: o grande desafio. *Pro-Posições*, 4(1), 35-41.
- D'Ambrosio, B. S. (1997). Using research as a stimulus for learning. *Journal for Research in Mathematics Education*. Monograph, Vol. 9, p. 144-177.
- D'Ambrosio, B. S. (2004). Preparing teachers to teach Mathematics within a constructivist framework: The importance of listening to children. In T. Watanabe, & D. Thompson (Eds.), *The work of mathematics teacher educators: Exchanging ideas for effective practice* (Vol. 1, pp.135-150). San Diego, CA: Association of Mathematics Teacher Educators.
- D'Ambrosio, B. S. (2014). *Living contradictions: Negotiating practices as Mathematics teacher educators*. Presentation at AMTE, Irvine CA Feb. 7, 2014. Retirado em 18 fevereiro, 2016, de <http://amte.net/sites/default/files/living-contradictions-dambrosio-amte-2014.pdf>.
- D'Ambrosio, B. S., & Cox, D. (2015). An examination of current methodologies in Mathematics Education through the lenses of purpose, participation, and privilege. *Perspectivas da Educação Matemática*, 8(18), 209-726.
- D'Ambrosio, B. S., & D'Ambrosio, U. (2006). Formação de professores de matemática: professor-pesquisador. *Atos de Pesquisa em Educação*, 1(1), 75-85.

- D'Ambrosio, B. S., & Kastberg, S. (2012). Giving reason to prospective mathematics teachers. *For the Learning of Mathematics*, 32(3), 22-27.
- D'Ambrosio, B. S., & Lopes, C. E. (2014). *Trajetórias profissionais de educadoras matemáticas*. Campinas, SP: Mercado de Letras.
- D'Ambrosio, B. S., & Lopes, C. E. (2015a). Bold journeys of Brazilian Mathematics Education researchers. In B. S. D'Ambrosio, & C. E. Lopes, *Creative insubordination in Brazilian Mathematics Education research* (pp. 31-39). Raleigh: Lulu Press.
- D'Ambrosio, B. S., & Lopes, C. E. (2015b). Movimento da insubordinação criativa em algumas pesquisas brasileiras em Educação Matemática. In B. S. D'Ambrosio, & C. E. Lopes, *Vertentes da subversão na produção científica em Educação Matemática* (pp. 369-379). Campinas, SP: Mercado de Letras.
- D'Ambrosio, B. S., & Lopes, C. E. (2015c). Práticas que redimensionam o sucesso em matemática. In B. S. D'Ambrosio, & C. E. Lopes, *Ousadia criativa nas práticas de educadores matemáticos* (pp. 269-283). Campinas, SP: Mercado de Letras.
- D'Ambrosio, B. S., & Lopes, C. E. (2015d). Insubordinação criativa de educadoras matemáticas evidenciadas em suas narrativas. Proceedings of the CIAEM-IACME, 14 (pp. 1-12). Retirado em 30 de março, 2016, de http://xiv.ciaem-redumate.org/index.php/xiv_ciaem/xiv_ciaem/paper/viewFile/391/189.
- Duckworth, E. (1987). *The having of wonderful ideas: And other essays on teaching and learning*. New York: Teachers College Press.
- Kastberg, S. E., D'Ambrosio, B. S., McDermott, G., & Saada, N. (2005). Context matters in assessing students' mathematical power. *For the Learning of Mathematics*, 25(2), 10-15.
- Kastberg, S. E., D'Ambrosio, B. S., & Lynch-Davis, K. (2012). Understanding proportional reasoning for teaching. *Australian Mathematics Teacher*, 68(3), 32-40.
- Lester, F. (2015). Speech given at celebration of life event for Beatriz Silva D'Ambrosio, September 26, 2015. Oxford, OH, USA.
- Lopes, C. E. & D'Ambrosio, B. S. (2015). Sowing new and rare seeds in Mathematics Education. In B. S. D'Ambrosio, & C. E. Lopes, *Creative insubordination in Brazilian Mathematics Education research* (pp. 253-259). Raleigh: Lulu Press.
- Lopes, C., Grandó, & D'Ambrosio, B. (2016). Experiences situating Mathematical problem solving at the core of early childhood classrooms. *Early Childhood Education Journal*, 44(1), 1-11.
- Murtadha-Watts, K., & D'Ambrosio, B. S. (1997, December). A convergence of transformative multicultural and Mathematics instruction? Dilemmas of group deliberations for curriculum change. *Journal for Research in Mathematics Education*, 28(6), 767-782.

Norton, A., & D'Ambrosio, B. S. (2008). ZPC and ZPD: Zones of teaching and learning. *Journal for Research in Mathematics Education*, 39, 220-246.

Steffe, L. P., & D'Ambrosio, B. S. (1995). Toward a working model of constructivist teaching: A reaction to Simon. *Journal for Research in Mathematics Education*, 26(2), 146-159.

Submetido: outubro de 2016

Aceito: novembro de 2016