

**Teaching without Teaching?
The Role of the Early Childhood Educator
Co-constructing Long Term Investigations with
Children**

by

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Abstract

There has been much interest in emergent curriculum in early education in the last twenty years, partly due to the inspirations of collaborative pedagogical work between children and teachers of the municipal preschools of Reggio Emilia, Italy. In the absence of research denoting the tensions inherent in the complex role of the teacher co-constructing curriculum in a long term project, this narrative inquiry case study investigates the decision making process and implementation of experiences among nine preschool children and two teacher researchers inquiring about a topic related to their new school building. The data will consist of field notes, transcripts of meetings, and video recording of work with children, as well as teacher reflections and pedagogical narration. Data analysis will be carried out by narrative descriptions of the tensions within the decision making process. This research attempts to fill a gap in understanding of the ECE teacher's roles in starting and sustaining inquiry based learning in their programs. Findings include a discussion on the impact of Constructivism on the teacher's decision making, the privileging of oral language as a form of meaning making, the value of revisiting work with children and the connection between passion and the teacher's role in project work.

Keywords: projects; long term investigation; Early Childhood Education curriculum; The Reggio Emilia Approach; the role of the teacher; art based learning

In memory of my mother; for the path of passion.

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Table of Contents

Approval.....	ii
Ethics Statement.....	iii
Abstract.....	iv
Dedication.....	v
Acknowledgement.....	vi
Table of Contents.....	vii
List of Acronyms.....	ix
Preface.....	x

Chapter 1. Introduction: We make the road by walking.....	1
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Chapter 2. Review of Literature: Foregrounding, Map and Compass.....	6
2.1. Leading the Way: Theoretical Constructs of ECE Practice.....	7
2.2. Beyond Child-Centered: Tzuo’s Conceptualization of High Children Control/High Children’s Freedom.....	9
2.3. Reggio Emilia Pedagogy: Footprints.....	10
2.4. Scaffolding in broad terms: Gentle Pushes.....	14
2.5. Walking and Emancipating.....	17
2.6. The Affordances of Passion: The Indefatigable Traveler.....	20

Chapter 3. Methodology: Charting Routes.....	21
3.1. The Curious Traveller: Research Questions.....	21
3.2. Walking and Gathering: Data Collection.....	23
3.3. Making sense of the expedition: Data Analysis.....	23
3.4. Procedures: Getting Ready to Venture.....	27
3.4.1. The Children.....	27
3.4.2. Child Care Center.....	28
3.4.3. The Building.....	29
3.4.4. The Early Childhood Educators.....	29
3.4.5. The Researchers.....	30
3.4.6. Elaine – Co-Researcher.....	30
3.4.7. Margaret – the Co-researcher.....	31
3.5. Conscientious Travelling: Ethical Considerations.....	32

Chapter 4. Data analysis: The Story about the path making.....	34
4.1. Back Steps: Revisiting the work with Children.....	36
4.2. Teacher as a Protagonist.....	39
4.3. Leading the Way.....	42
4.4. The Beaten Path: Troubling Constructivism.....	44
4.5. Social Constructivism.....	47
4.6. Negotiating the Routes: Walking and Talking in Multiple Languages.....	49
4.6.1. Walking and Playing.....	51

4.7. Advances, Standstills and Retreats: Rest in Making the Path	54
4.8. Walking Poles: Structures that support long term inquiry	57
4.9. Is Talking the Only Walking? The Supremacy of Oral Language	60
4.10. More than One Way to Tread	62
4.11. Rounding Up: Weaving Approaches	64
4.12. The Indefatigable Path Maker: A Pedagogy of Passion	66

Chapter 5. Conclusion. Arrival: Looking Back. Looking Ahead 72

5.1. The Lay of the Land: The Practice of Revisiting.....	73
5.2. Walking Poles: Structures that Support Long Term Inquiry	73
5.3. Walking and Talking	75
5.4. Zigzag Teaching: Weaving Different Approaches	75
5.5. Limitations and Areas for Further Research.....	78

References 81

Appendix A. Strategies: “Advances, Standstills and Retreats”	85
Appendix B. Conversations with Children	109
Appendix C. High Teacher Control/High Children’s Freedom.....	122
Appendix D. Reflections	124
Appendix E. Samples of Pedagogical Narrations	132

List of Acronyms

BC	British Columbia
ECE	Early Childhood Education
SFU	Simon Fraser University

Preface

The Bio-reactor Project “The Animals that Eat Poo”

Allons! To look down no road but it stretches and waits for you, however long, it stretches and waits for you (Whitman, 1983, p. 123).

This is a story of a nine month journey to co-construct a project with children exploring the green building that houses their child care centre. The inquiry was carried out through drawing, conversations, clay and drama.

It started with an interest in a control panel that monitors the building. Along the way, the gist of the inquiry for the children became the micro-organisms that live in the outdoor tank. They consume toilet waste and clean the water, which is then utilized for irrigation.





Studying the building and grounds is a pedagogical value of the child care centre. A document was elaborated to reflect the on-going investigations and propose new ones. The Foundations of Intentions (MacDonald, in press) was developed by the scholar in residence, Margaret MacDonald through the input of the educators at the building, and was presented to parents. In line with this document, this research reflects the value of studying the building, as it seemed preposterous to live in such an intriguing space without knowing its affordances. As well, the building seemed a good pretext for investigating the value of sustainability that engendered its very construction. An excerpt of the document is shared below to situate the choice of studying the building.

Capacities: <i>To deepen our understandings of:</i>	The Forest	Building and Grounds	Gardening and composting	Re-cycling
<p>Origins</p> <p>Rationale: Finding out where things come from can strengthen our dispositions toward inquiry and deepen our connections to our surroundings, sense of wonder, belonging, care, respect and ingenuity</p>	<p>Seeing plants and trees change and grow through the seasons and observing life emerge (mushrooms after rain!, new sprouts in the spring) can deepen our understanding of origins and connections</p>	<p>Our building is designed in a unique way. It uses the earth and sky to heat and cool the air in the building and enzymes (small living organisms) help recycle waste from the toilets and grey (dirty) water from the sinks</p>	<p>In our climate (our temperature and amount of precipitation throughout the year) there are certain types of vegetables that grow at certain times of the year.</p>	<p>Thinking about how things are made can help us understand how we can creatively and artistically use things differently and how we can learn more about the things we use.</p>

We set out on studying the building by honoring children's natural processes of observing, touching, smelling, and hearing; by rubbing textures and by photographing their explorations. These explorations were taking place when a child, M.I. asked the teachers a question about the bio-reactor panel. K., the administrator, heard it and shared it with me. Although M.I. declined the invitation to visit the panel, he showed me the drawing related to it. With his permission, I presented it to the children at group time and invited them to observe the panel. A few visits ensued and they drew to notice and to inquire. One of the questions pertained to the green, blue and red lights going on and off. Based on this interest on the panel, the technician that monitored the system opened it for the children.



This launched an investigation about the panel's functioning, especially when a child that was leaving for kindergarten told the group about the toilet flooding and its connection to the panel.



In one of the visits to the panel, by studying the diagram, M. theorizes that the V shape represented the tank, revealing that the outside tank and the panel were connected. Had he seen the technician working at the tank? M. asks to go outside to visit to the tank. The group then gathers outside to listen, smell, and articulate their perceptions about the noise, smell, movement, and water. In one of the subsequent experiences, on top of the tank, amidst its noise and odor the children drew their theories about its functioning. We revisited these drawings to detect the meaning making, which had to do with movement and hearing the water.



The technician opened the tank and upon learning that there were micro-organisms cleaning the waste, the children’s curiosity about these animals was sparked. This set in motion the investigation about the micro-organisms, as the children seemed

interested in their anatomy and actions. Above all, they seemed intrigued by the fact that micro-organisms “ate” toilet waste.



Engaging with the arts, the children represented the tank and the micro-organisms with clay and drawing and drama. Through the sciences, the children made observations, predictions and formed theories.



Children's comments.

"Some lights are off and some are on."

"Four light on. Nine lights out. Maybe Rudolf turns on some lights when he gets here"

"Toilet flush, turn, turn, turn. The new water comes in and out. Down, down, It comes down here. It goes ssshhhhhshshss (flushing sound). It comes here again."

"Why does the water stop"?

"Why does the poo/pee flush two times?"

We took notice of the children's strong competence in the language of drama and applied this to their curiosity about the micro-organisms to co-develop a play. This was the finale of our investigation, when we shared the learning with the peers and families, but also celebrated the inquiry with the children. It was my intention that the play would bring it all together, co-joining fact and fantasy and mark this exploration in place and time to become a point of reference in children's learning. Furthermore, in that the play was child generated, the piece conveyed a strong image of the child of competence and capable of teaching others their own understandings about the micro-organisms.



This is a simple version of the story, a summary of what transpired in ten months of inquiry. There is a lot more to it! To glean insights into the role of the teacher in this complex process, walk with me through the trials and tribulations of co-constructing projects with children.

I suggest that the reader gets first familiarized with this trajectory by consulting the pedagogical map, or the documentation of the steps taken in the making of this path. For stylistic purposes it appears as Appendix A.

Early Childhood Educators will also be referred to as teachers. Not only for stylistic purpose in avoiding repetition of terminology, but also because it is my belief that the word 'teacher' can and should be used outside the context of grade schools. I speak both as an Early Childhood Educator and School Teacher and feel comfortable using the word 'teacher,' aiming at informing the misconception that Early Childhood Educators "just" watch children play.

Chapter 1.

Introduction: We make the road by walking

<i>Caminante, no hay camino</i>	<i>Wanderer, there is no path</i>
<i>Son tus huellas</i>	<i>Traveller, your footprints</i>
<i>El camino e nada mas</i>	<i>Are the path, nothing else</i>
<i>Caminante no hay camino</i>	<i>Traveller, there is no path</i>
<i>Se hace camino al andar</i>	<i>A path is made by walking</i>

(Machado, 1912)

What happens behind the scenes of path making when negotiating long term investigations with young children? What is it that teachers do?

The choice of the experience of revisiting for the day seems to indicate that we need to revise our strides in making this path. There are exposed roots, rocks and branches that make us stumble in our walk. The bumps are the path. There is no other way. Marcus keeps explaining the whole process over and over. We also repeated “poo theatre” many times. Should we linger with the representations of the micro-organisms to foment details as we are trying to do with clay or should we move on? Should we go back to the poo theatre? Are children ready for more? And if so, what would it be?

I must accept this disorientation. I feel too committed to the making of this road. I humbly acknowledge that I do not know how to walk in parts of the terrain.

“Tinha uma pedra no meio do caminho. No meio do caminho tinha uma pedra”
(Drummond de Andrade, 1930)

“There was a stone on the path. On the path, there was a stone”.

The very repetition in this line of Drummond's poem acquiesces the fact that walking this path is a complex undertaking and challenges were expected along the way. The metaphor about the making of a path has strong meaning for me. I studied Reggio Emilia practices but I never carried out an open-ended long investigation with children. I did partner with my Early Childhood Education students to implement emergent curriculum, but this did not go beyond the four weeks of practicum. I even carried out a project with a grade two classroom but it had a very specific aim of facilitating the understanding of sources of energy through experiments, but there were no negotiations based on documentation of children's work to envision responses. I had a list of experiments for them to try.

Machado's poem of the wanderer making the path conveys the context of this study. We were walking on unmapped territory. I have never co-constructed a long term investigation with children. In other words, the site of research being a new child care center and my status as novice in a long term inquiry make the metaphor of making the path especially apt. As well, the path to me represents what Biesta proposes as the purpose of education, beyond "drawing out what is already there" (Biesta, 2012, p.41).

The story told below aims at sharing the process, hoping to propose to ECE educators that one is not required to be expert explorer to engage in collaborative inquiry in making a path with children.

Rinaldi (2006) contends that "Listening to children is difficult, and [to] interpret what we observe in a comprehensive way is even more difficult" (p. 128). What makes listening so challenging in the context of long term investigations? This study will attempt to walk others through our process while we glean insights into what teachers do in inviting, responding and sustaining a long term inquiry with children.

I read about and attended many presentations on the topic, but felt that challenges were not obvious. They were mentioned but rarely exemplified. "The children did this, and we responded with that". I knew that this could not be this simple, and so decided to try it myself and engage with the difficulties inherent in listening and interpreting the children's meaning making. I hope that this study will inform and provoke other teachers to do the walk of long term inquiry with children.

In North America Emergent Curriculum is the closest practice to Reggio Emilia pedagogy of *progettazione* (Edwards et. al, 2012). Vecchi defines it as follows:

By project work (*progettazione*), I mean work in which adults (teachers, atelierista, pedagoga) make initial hypotheses and seek to have a deeper understanding of an area or topic where key elements for moving forward come from work with the children, and careful analysis by adults of what is happening along the way” (Vecchi, 2010, p. 120).

Jones (2010) defines emergent curriculum as:

Emerge[ing] from the children, but not only from the children. Curriculum emerges from the play of children and the play of teachers. It is co-constructed by the children and the adults and the environment itself. To develop curriculum in depth, adults must notice children’s questions and invent ways to extend them, document what happens, and invent more questions (Jones, 2012, p.67).

In my role as instructor in an Early Childhood college setting, I visit child care centres to mentor practicum students. What I see is a prevalence of a hands-off approach to curriculum, with teachers preparing the environment and fading from action, as described by Kontos (1999). Another issue that I encounter in practice is that teachers wait for curriculum to happen or to “emerge” as the terminology indicates. This sometimes is the case as children bring much wonder to their lives at the child care centre. The problem is that teachers often seem unaware that they too can make invitations for the children to inquire about through play and investigation. This is another reason why I chose to undertake this study, as the genesis of our investigation conveys the value of engaging with sustainability and their immediate environment. We set the topic, but the commitment to listen to the children’s constructs in order to respond and challenge is what drives the pedagogical work.

Child selected play in a prepared environment defines curriculum in the field of early childhood education, as defined by the position statement of the National Association for the Education of Young Children (NAEYC, 2009). I agree that the play pedagogy currently appears “as incompatible with a discourse of teaching” (Thomas & Vries, 2011, p. 72). This connotes that children learn by playing with other children through manipulation of toys and materials objects, making the teacher obsolete.

I hope to glean insights into this conundrum of ECE teachers not teaching by illustrating the role of the teacher in the project. I have done the “talk” about Reggio Emilia inspired investigations with children, now it is time to do the walk and construct meaning in action, as a teacher of young children.

The literature informs this study by discussing the prevalent discourses of constructivism and child centered practice, and reports how it enables and constrains the role of the teacher in growing curriculum responsively with the children, to the context and values of the child care centre. In addition, the literature discusses social constructivism and Reggio Emilia pedagogy, which is seen as having reclaimed the role of the teacher (Grieshaber, 2008). Through the Foucauldian lens of Johnson (1999) we interrogate the hold that Reggio Emilia pedagogy has on ECE practice, which is professed to have become another regimen of truth (Johnson, 1999). I endeavour to understand the concept of passion within the investigation through Zembylas’ reading of Foucault’s work on madness. Zembylas entreats that

The practice of passion in the context of teaching and learning constitutes an art of creating an environment that encourages different assemblages, beyond usual thresholds, in order to make passages for the pleasure of passions (Zembylas, 2007, p.145).

I attempt to situate the discourse of passion within the teacher role for believing that negotiated project work disrupts the normative role of the ECE teacher within child centered and constructivist practices.

Biesta (2014) claims that the language of learning inherent in the constructivist approach obfuscates the role of teacher for putting the emphasis on the actions of the learner. This contention will be applied to elucidate the challenges in decision making through our process.

Methodologically this analysis of data is conducted through the sharing of a story, in that the narrative inquiry paradigm “tries to make sense of life as lived” (Clandinin & Connelly, 2000). In the same line, Leggo (2007) contends that narrative inquiry “honour[s] the tangled complexity of lived experience”. Within this context, the data analysis is carried out through excerpts of reflection, pedagogical narrations or stories of

teacher and children's inquiry, transcripts of conversations with children, photographs and stories of conversations with the collaborator. These documents shall elucidate the conundrums to be expected when embarking on an open-ended venture when child and teachers are co-constructing curriculum.

I name this study "teaching without teaching" a paradox that originates from Grieshaber's contention that educators of young children feel discomfort with teaching, for the constructivist nature of their pedagogy proposes a hands-off approach with children learning on their own. As a result, "they [teachers] are compelled to 'teach', but especially with regard to the discipline of the arts, to do so with the appearance of 'not teaching'" (Grieshaber, 2008, p. 512).

It is my intention to further investigate this understanding by making visible the teaching process, that is, decision making about challenging the children, or instances of direct teaching to nurture the investigation.

In what is a long and arduous walk to investigate the co-construction of curriculum with children, as Alice in Wonderland, I hope to get somewhere.

Alice: Would you tell me, please, which way I ought to go from here?

The Cheshire Cat: That depends a good deal on where you want to get to.

Alice: I don't much care where.

The Cheshire Cat: Then it doesn't matter which way you go.

Alice: As long, as I get somewhere

The Cheshire Cat: Oh, you are sure to get there, if you only walk long enough.

(Carroll, 1865)

And so, I set foot on the quest to co-construct curriculum.

Chapter 2.

Review of Literature: Foregrounding, Map and Compass

Early childhood educators teach! This I say within a progressive view of teaching, not as dispensing knowledge but as a process of decision making about what, when and if teaching is called for. Thomas, Warren & Vries (2011) suggest that ECE pedagogy replace the learning through play discourse to teaching through play, for the terminology elucidates the role of the educator. This would inform the constructivist misguided assumption that in play pedagogy the educator is dispensable (Thomas, Warren and de Vries, 2011). Applying both terms: learn through play and teaching through play may generate interesting debate in the field about the complexities of the teacher's work implementing curriculum.

I will present in this section the evidence that research about early years teaching practice is in demand. Ryan and Goffin explain that:

The absence of attention to teachers and teaching is reflected in the limited research base on teaching. It is only in the past 10 years that research on teaching has gained prominence, minimal as it is, as a field of study in Early Childhood Education. Yet few programs of research foreground the complexities of what it is that Early Childhood Educators do (Ryan & Goffin, 2008 p. 387).

In line with the above, the aim of this study is to engage with and share the complexities of the process of undertaking a long term negotiated inquiry with young children. Since this study is informed by Reggio Emilia pedagogy, which is self proclaimed socio-constructivist in nature (Edwards et. al, 2012), I shall situate it within a socio-constructivism framework, discussing Vygotsky's concepts of the zone of proximal development and scaffolding. The remainder of the literature will present Biesta's understanding about education and teaching, which hopes to inform the meaning of

teaching in ECE. Through his arguments about reclaiming the role of the teacher in education, I link the theoretical constructs informing practice: child-centered, social constructivism, and Reggio Emilia pedagogy.

2.1. Leading the Way: Theoretical Constructs of ECE Practice

The discourse of child-centeredness that informs ECE practice suggests that teachers take a hands-off approach to children's learning, expecting children "to learn and grow on their own" (Grieshaber, 2008).

The theoretical framework of constructivism is in part to blame for this conundrum. According to Grieshaber (2008), constructivism infers a more passive role of the teacher in setting up the environment for play, and observing without much participation. It is also her contention that the more interactive Vygotskian theory of children co-constructing meanings with each other and other adults has not been well unpacked in the field. To illustrate this, Grieshaber (2008) notes that the concepts of ZPD (zone of proximal development) and scaffolding were included in the last edition of Developmental Appropriate Practice, (DAP) a document developed by the US National Association for the Education of Young Children that informs ECE practice. Yet, she claims that the differences between Piaget's and Vygotsky's theories were not highlighted (Grieshaber, 2008)

Meade (2000) posits that despite the socio-cultural paradigm of current ECE practice, a disposition of "non-interference" of teachers in children's experiences prevails. She adds that much research has been devoted to the inefficacy of teachers who control and interfere in play, but that little has been done to investigate the possible benefits of the teacher role in fomenting learning. She adds that "my argument is for teachers responding to children's interests and engaging with their "unreturnable moments" in play and discovery (Meade, 2000, p.18). This study aims at augmenting research about early childhood educators attuned to provoking and responding to children in the pursuit of long term inquiry.

In a study about the teacher's role during play time at preschool, Kontos (1999) found that, although teachers spent a great deal of time interacting with children, the conversations were not content or inquiry rich. I have often wondered if this lack of scaffolding interferes with the genesis and sustenance of curriculum within the paradigm of emergent curriculum. If rich comments and questions are not articulated and pursued, how then will children share their perspectives about a topic of investigation?

Tzuo (2007) reconciles the engagement/non-engagement paradigms of teacher and child interactions by proposing that both discourses are possible depending on the affordances and constraints of each situation. There may be occasions when explorations can evolve independent of the teacher's direct participation, whereas other times the teacher's coaching may be paramount to support learning.

By the same token, in a study of ECE teachers unpacking their role in Math explorations with children, Thomas, Warren & de Vries (2011) propose that it is possible to interrupt the divide between intentional teaching [teacher participation] and play based learning, as both paradigms can and need to co-exist so as to provoke and sustain children's learning.

In summary, what research and theoretical constructs suggest is that within the discourse of play, there is a definite role for the ECE teacher to directly exercise intentional teaching by determining the situations in which her actions could provoke learning. This is aptly articulated in this passage by Thomas et al. (2011): "Further challenge to a traditional notion that early childhood education does not involve teaching comes from Siraj-Blatchford (2009) when she identifies quality teaching as a key component of quality learning for young children".

The discussion about child-centered practice following this section, shall address issues relating to the teacher's hands off approach to children's inquiry.

2.2. Beyond Child-Centered: Tzuo's Conceptualization of High Children Control/High Children's Freedom

Tzuo (2007) argues that child-centered philosophy has been conceptualized as the focus on children's free choices of play and interests to drive the curriculum and learning. It contrasts with a more traditional paradigm of teacher-centeredness, where the teacher takes a more direct role with instruction.

Meade (2000) believes that discourse of child-centered practice is still prevalent in the ECE field and that this compromises the teacher's actions in scaffolding learning. This mitigates the opportunities for children to be further challenged. In the same paper, Meade cites Erica Burman to illustrate the dilemmas inherent in adhering to child-centered practice in play.

The focus on "play" suggests that learning should be voluntary, enjoyable, self-directed, non-goal oriented, fundamental for emotional being....Finally, the role of 'discovery' highlights that learning takes place outside the individual, personal experience.

[The] teacher attempting to conform to these precepts encounters an untenable conflict between the mandates for non-interference to promote independence, and her institutional position as responsible for children's learning (Meade, 2007, p. 17).

These tensions about the role of the teacher within child-centered practice are also manifested by Thomas et al. who assert that "a discourse about children's play can also constrain the role of the teacher" (2011, p. 72). In a study about intentional teaching, these researchers videotaped two ECE teachers applying mathematical explorations. The videos were shown to the teachers to elicit discussions about their role. Results showed oscillation between children exercising complete agency in play as in child-centered practice, and the more direct role of "control of the learning process" through scaffolding, and offering materials to extend the explorations (Thomas, Warren & de Vries, 2011).

For the researchers in the study described above, it is possible, to a certain extent, to resolve the tension between these two discourses of play based on intentional

teaching. They re-iterate that teachers are to develop more awareness about the roles that they take. This will facilitate better choice making (Thomas et al, 2011).

I will now situate Reggio Emilia pedagogy in this study, for reportedly reconciling the direct and indirect role of the ECE teacher in children's learning (Grieshaber, 2008). One of the tenets of this approach is that the teacher is a researcher, or co-researcher as she involves children, other teachers, and parents in the process of developing curriculum (Edwards, Gandini & Forman, 2012).

2.3. Reggio Emilia Pedagogy: Footprints

I agree with Grieshaber (2008) that it is difficult to introduce complexities and accomplishments of Reggio Emilia practice in a few words. However, since the schools of Reggio Emilia have captured the imagination of ECE practitioners, I shall briefly describe their approach related to the context of my investigation, more precisely the projects developed with young children.

Located in Northern Italy, the Reggio approach to preschool education extrapolates from the prevalent Piagetian discourse of the free exploration in a prepared environment. Reggio pedagogy is an example amongst other paradigms of the adoption of Vygostkian perspective of co-construction of learning through collaboration with adults and peers. Not only do the children construct meanings in collaboration and expression through discussion and artistic ways to represent meaning, but so too do the teachers in studying children's work to design experiences as responses. (Edwards et al. 2012).

Inspired by John Dewey, Reggio Emilia educators embrace the practices of co-inquiry in exploring long-term projects with children (Edwards et al, 2012). I find the definition below helpful in situating the type of investigation that I aim to pursue with the children, for it clearly conveys the role of the teacher in attempting to negotiate what comes from the children with her intentions. Vecchi (2010,) states that:

Greater importance is given to some parts of a project than others, to images and thoughts slowly emerging in the children and which require agreements based on reflection and mediation, between the wishes and thoughts of the children and those of the teachers to decide which pathway is most opportune to follow. Choices must not betray the thinking of the children or nature of the theme we are working on (Vecchi, 2010, p. 120).

One is often mesmerized by the strong sense of agency that children exercise during these projects, through invitations to wonder, to elaborate, share and revisit their theories, represent their understandings and curiosities verbally and symbolically through the arts (Edwards et. al, 2012).

Grieshaber (2008) points out that Reggio Emilia seems to have been able to bridge the gap between teacher-centered (direct instruction) and child-centered practice (following children). By studying the documentation of children's work through anecdotes and reflections, children's voiced theories orally or graphically, films and photographs, teachers construct reflective stories of children learning that will facilitate discussion and inform the decisions about the next steps to be undertaken by curriculum. These reflective stories are called *documentazione* in Reggio Emilia (Edwards et al. 2012), and pedagogical narrations in BC, Canada (*BC Early Learning Framework*, 2008).

In addition, Grieshaber (2008) contends that "The net result [of the documentation and discussion of children's work], is a change in the image of their role as a teacher, a change from teaching children to studying children, and by studying children, learning with children (p. 510). It is in consideration to these many factors that I propose that Early Childhood Educators *teach*. The whens, hows and whats will hopefully be uncovered through this study.

The passage below conveys the Reggian definition of teaching that is contrary to the traditional definition of explicating content. Malaguzzi espouses that "our teachers realize that they must avoid the temptation of expecting children to give them back what they already know, but that instead they must retain the same sense of wonder that children live through their own discoveries" (Edwards et al, 2012, p. 61).

I agree with Grieshaber (2008) that Reggio Emilia seems to have found a balance between teacher-centered and child-centered practice. However, I evidenced in my practice that our field has insufficient understanding about this negotiation, and this has fueled my quest for shedding light into this issue.

In Reggio Emilia pedagogy there is no pre-planned set of lessons, however, teachers do make flexible plans about possibilities of long and short term investigations to present to the children. In consideration of the children's responses the teachers will then decide if, how and when to proceed (Edwards et al, 2012). This teacher does not sit and wait for an invitation for curriculum to emerge (as it sometimes spontaneously happens). She is "allowed" to make flexible plans, as long as she abstains from "subtle manipulation of the project theme so that it will end up in a certain place" (Edwards et al, 2012). The teachers do not know where the group will end up. Although this openness adds a dimension of difficulty to their work, it also makes it more exciting" (Edwards et al, 2012). The excitement, I presume, come from the newness, or the promise of new routes, and itineraries that counteract the monotony of repeating pre-planned lessons.

The portrayal of the teacher in Reggio Emilia practice exemplifies discussion on intentional teaching, previously presented in this chapter (Thomas et. al, 2011). As well, it reflects Malaguzzi's analogy of the teachers as brick layers [enacting intentionality] constructing the foundation of a building to possibly be transformed by the children, whose architectural vision of the building will define the project (Edwards et al, 2012). Alluding to the constructing of the path metaphor, the teachers would then present the intention to make the path; the ways to walk the path is decided with the fellow walkers.

We now turn to Tzuo's engagement with child-centered practice to continue the conversation about the role of the Early Childhood Educator in implementing emergent curriculum with children.

Tzuo (2007) situates child-centered practice within the paradigms of teacher and child freedom and control. Further, Tzuo proposes an interesting question:

Should teacher control actually not be contradictory to children's initiatives in learning if control is applied appropriately to ensure children's freedom of enacting their learning initiatives, interests and needs in an appropriate way in order to promote their development? (Tzuo, 2007, p. 34)

This question illustrates well the metaphor of Malaguzzi's brick layers, where the teacher is exercising agency (or "high control" in Tzuo's words] in offering an invitation that could instigate creative learning whereas the children have "high freedom" to embrace the invitation and transform it (Tzuo, 2007).

This paradigm of high teacher control and high children's freedom is also exemplified in Edwards' discussion about the different roles undertaken by teachers who do take the lead by chairing meetings with children, presenting possibilities and contradictions that will ignite explorations. Other times they will take the role of the listener, observing and taking notes of children's theories. Edwards re-iterates that these roles are crucial in keeping the momentum of an exploration (Edwards et al, 2012).

In the same line, Malaguzzi professes that:

In trying to make a good project, one has to have, above all, a pertinent expectation, shaped in advance, an expectation also felt by the children. This expectation helps the adults in terms of their attentiveness, choices, methods of intervention, and what they do concerning the relationships among participants (Edwards et al., 2012, p.54).

I am curious about the role of the teacher in constructing and communicating this expectation to the children. To me this represents a tension in the role of the teacher, as it extrapolates from the child-centred model that drives ECE practice; clearly the teacher has a strong role beyond what is brought to her by children.

The metaphor of the ball tosser is linked with the expression of intention. Fellipini, a pedagogical coordinator in the Reggio Emilia schools proposes that:

We [teachers] must be able to capture the ball that the children throw us, and toss it back to them in a way that makes the child continue the game with us, developing perhaps, other games as we go along (Edwards et al, 2012, p.151).

Even though a proposition of a topic to study can stem from the teacher, the children's responses to this invitation will be capitalized and the type of game may change. Democratic principles of education are still being exercised, as children will be negotiating the curriculum alongside the teachers. Clearly the teacher has a much more direct role in children's learning than preparing the environment and observing as play unfolds, as Grieshaber (2008) critically points out.

2.4. Scaffolding in broad terms: Gentle Pushes

Socio-constructivism imbedded in Reggio Emilia pedagogy (Edwards et al. 2012, p.) draws upon Vygotsky's concepts of the zone of proximal development and scaffolding. These concepts speak to the role of the teacher in negotiating curriculum with children and other teachers. Here is the definition of Vygotsky's zone of proximal development:

It is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

In this study I foresee situations when adult support will be called for, as well as situations when peers can support one another in exploring the experiences collaboratively designed by the teachers. However, I will also apply the concept of ZPD broadly in the sense that I aim at fomenting and challenging the children to construct theories by studying their responses to the designed experiences. This will require an understanding about where the children are at and where they could go; on this account the concept of ZPD seems appropriate, as it calls for teacher interpretation in how to act.

The concept of scaffolding is used in socio-constructivist pedagogy to indicate the process of engagement with the zone of proximal development. Smith (2009) explains that the term scaffolding was developed by Jerome Bruner to address the actions inherent in applying the ZPD concept:

So Bruner borrowed the word [from the construction industry] to explain the interactional support, often in the form of adult-child dialogue. That is structured by the adult to maximize the growth of the child's intrapsychological (which means what happens inside the learner) functioning" (Clay and Cazden, 1990 as cited in Smith, 2009, p. 121)

I now situate the role of the teacher in scaffolding through Bruner's lens in

Smidt, (2009).

1. *protect* the learner from distraction by highlighting the significant feature of features of the problem;
2. *sequence* the steps to enable understanding;
3. *enable* negotiation between teacher and learner;
4. *know* just what it is that the learner needs in order to succeed

I foresee an engagement in the practice of scaffolding in our project when enacting what Mallaguzzi calls "a pertinent expectation" (Edwards et. a, 2012) to co-construct meanings about a topic of investigation, to highlight and sustain the inquiry.

In a study of Dewey's philosophy mirrored in long-term projects, Glassman and Whaley (2000) present a synopsis of two such explorations, highlighting the sophistication of Vygotsky's concept of scaffolding through the illustration of two different explorations within the same topic.

In this scenario, the teachers offered an invitation to the children to explore camping, seeing that this could be a rich provocation to continue exploring the topic that started with a preschool camping event. Following the children's prompts, the teachers set up a tent and flashlights. Upon realizing that camping was not the focus of children's explorations, the teachers then set out to harness children's curiosities about shadows that the flashlights were producing, which then became a long term project about shadows. The researchers then followed this investigation by documenting the responses about the two groups into which the children were divided to: one younger and one more advanced group (Glassman & Whaley, 2000).

The first group composed of younger children explored shadows through observations, tracing to detect movement, photographs and theorization. The project evolved for a long period of time, allowing the children ample opportunity to befriend the topic of investigation and repeat some experiences by exploring shadows indoors and outdoors, tracing their shadows at different times during the day to understand its genesis (Glassman & Whaley, 2000).

Composed of older children, the second group explored shadows by drawing. The teacher invited the children to predict the movement of shadows by drawing them. Subsequently, she built a bridge with Lego and proposed that the children draw its shadows. The teacher then challenged the children to predict how the shadow changed as the sun moved. The result of this scaffolding led the children to lose interest in the project, as the teacher's invitations to reason became too complex (Glassman & Whaley, 2000).

The researchers concluded that the teacher of the advanced group became too directive in her impetus to foment learning. In enacting a "teachery" role, the teacher pushed the children too fast and too far, hence compromising the children's motivation to learn (Glassman & Whaley, 2000). Within the context of the pedagogy of listening (Rinaldi 2006), in this case, the teachers were not lending their ears to the children's meaning making, failing to attend to children's interests.

The above example clearly portrays the level of sophistication required by teachers in deciding on responses that capture children's curiosities in the unfolding of emergent curriculum. Both teachers embraced the children's interest in shadows but if we relate these scenarios to Filippini's analogy of the ball game (Edwards et al, 2012), the first teacher tossed the ball with appropriate force, keeping the child engaged in the game, while the second threw it too hard, and the children were unable to catch it, thus appearing incompetent and withdrawing. It's important to note that in these two situations the teachers were at least committed to responding. Inhibited or unprepared to take responsive steps I contend that many Early Childhood Educators miss these rich opportunities to capture an interest and respond. These tensions of attempting to embrace children's sympathies about a topic, while choosing the right amount of

provocation to offer is one of the aims of this study about the teacher role in emergent curriculum.

This example attests to the claim for further research on the role of the teacher framed in social cultural theory Grieshaber (2008). This is an area this study seeks to inform.

2.5. Walking and Emancipating

In order to further illustrate the tensions which emergent curriculum presupposes I now turn to a discussion of the role of the teacher as emancipator.

To advance his vision of an emancipating teacher, Rancière (1991) explores a tale about the “ignorant school master’, who taught the students French without being able to speak the students’ Flemish language, by using a bilingual book with the French translation of the Flemish text. Rancière suggests that the master pointed the way, but did not explicate, and on this account, did not stultify the intelligence of the student. Rancière complexifies the role of the teacher by pointing out that explication is essentially stultification, because it assumes an inequality of intelligence between the learner and the teacher. Typically the teacher will have more knowledge than the student, but the potential to exercise their intelligence are equal to both (Rancière, 1991). The co-constructive nature of this investigation with children shall disrupt the role of the teacher as explicator. Since the paradigm of explication is for the most part how I experienced education, I shall pay attention to the hold of explication on my actions. Returning to Rancière, Biesta points out that Rancière’s parable about the schoolmaster does not revoke the presence of the teacher, rather it infers the absence of a master-explicator (Rancière quoted in Biesta, 2010, p.543). Biesta interrogates the word ‘learner’ for inferring this condition of not yet a knower as the master (p. 543). Master explication thus undermines the intellect of the student. I argue that the hands-off approach to children’s play, by the same token, takes for granted the children’s strong capacity to make meaning through exploration. Reggio Emilia pedagogy counteracts this premise by advancing a strong image of the child that is capable and powerful (Edwards et al., 2012).

The pedagogy of listening practiced within the Reggio Emilia approach provides an antidote to explication in that it engages teachers in carefully observing and documenting children's work, dialoguing with other teachers to make an informed decision about a response, Rinaldi (2006) proposes that:

Listening as the premise for any learning relationship – learning that is determined by the “learning subject” and it takes shape in his or her mind through action and reflection, that becomes knowledge and skill through representation and exchange. Listening, therefore, as a “listening context”, where one learns to listen, to narrate, where individuals feel legitimized to represent their theories and offer their own interpretations of a particular question. In representing our theories, we “re-know” or re-cognize” them for making it possible for our images and intuitions to take shape and evolve through action, emotions, expressiveness, and iconic and symbolic representations (the “hundred languages”). Understanding and awareness are generated through sharing and dialogue” (Rinaldi, 2012, p. 50).

This state of attention to other perspectives complicates the role of the explicator, for it disrupts the certainty about when and what to “teach”.

Furthermore, in provoking children to construct and articulate their theories, teachers disavow explication; becoming instead emancipating educators that “...do nothing more (but also nothing less) than demanding that their students make use of their intelligence” (Biesta, 2010, p. 549).

We continue the discussion about the role of the teacher through Biesta's critique of constructivism, which, in his view, undermines the role of the teacher for privileging learning over teaching. Learning is seen as happening unbeknownst to the teacher, as the students are responsible for their own learning through exploration. The teacher is then relegated to a position of facilitation (Biesta, 2012, p.39). To counteract what he contends to be the “disappearance of the teacher”, Biesta (2012) proposes that:

The teleological character of education thus suggests quite a different position for the teacher, not as the one who is there to facilitate learning or to implement directives formulated elsewhere, but as the one that plays a central role in engaging with the question as to what is educationally desirable in each concrete situation, both to the regard to the aim and to the regard of the “means” of education (and means) here needs to be understood in the broad, non-instrumental sense, that is, as the way in which education proceeds in terms of its contents, its processes and its relationships. This is a matter of *judgment*, not a matter of execution of directives from elsewhere. (p. 39)

I believe that act of listening and deliberating about the curriculum point the way to emancipation. It is my view that whereas there seems to be a movement towards observing and documenting children’s work, ECE teachers like myself are caught in a quandary about how to apply this learning in implementing curriculum. With hopes to contributing in filling this gap, this study will attempt to convey how listening is translated to curriculum design in the context of our investigation.

To advance this discussion on role of the teacher, I now turn to Grieshaber’s contention:

I suggest that early childhood educators get in some theoretical rule bending, breaking and making, and challenge some of the dominant traditions of early childhood pedagogy (Grieshaber, 2008, p. 514).

With attention to “rule bending and challenging dominant traditions”, I now turn to Johnson (1999) who situates the uncritical allegiance to Reggio practice as an adoption of a regime of truth mirroring ECE practice. Grieshaber (2008) also reveals this concern about the perceived craze of Early Childhood Educators to “Reggio” their practice (p. 509). Because I am a Reggio Emilia enthusiast, I shall critically explore the hold that this has in my pedagogy. Neither am I in Reggio Emilia nor can have I reproduced its practices; rather, I will engage with its literature, and with some processes of exploration such as working with oral, visual and artistic languages and documentation of children’s work. Another connection with Reggio Emilia pedagogy with this study is my understanding of the practice of *progettazione*, or an open-ended project co-constructed with children.

Teaching then is not exclusively about the child; neither is it about explication and teacher-centeredness. As Biesta (2012) informs us, teaching is a matter of judgement or what Tzuo (2007) calls, a matter of co-existence of high teacher control and high children's freedom. This means that seemingly opposed paradigms are possible within the context of each situation, the provocations of the teachers, the responses of the children, the vision of the educators, the resources available, place and time.

2.6. The Affordances of Passion: The Indefatigable Traveler

Passion for education drives research in Reggio Emilia practice. This became evident in the readings, a study visit to Reggio Emilia and the many conferences attended on the topic. Therefore, I find it helpful to engage with the discourse of passion and its implications to the role of the teacher in long term investigations. Applying a Foucauldian lens, Zembylas (2007) claims that [a] politics of passion in education can be better understood if passions are taken into account not just as motivating, but as having a subversive role in teaching and learning (p.147).

Informed by my passion for dialoguing with children and educators, the survey of the terrain composed by the literature; and equipped with a compass and maps from previous travellers, we will now share the vision for walking the land of long term investigations with children.

Chapter 3.

Methodology: Charting Routes.

Through this study, I hope to glean insights into the role of the educator, its tensions and possibilities when pursuing a long term investigation with children.

More specifically, it seeks to deepen the researcher's understandings about the processes inherent in the pursuit of a Reggio inspired project, such as revisiting previous explorations with children, thinking through the arts, children's theorizing and co-construction of meaning.

As well, it is an aim to unpack the curriculum negotiation so as to understand the process of the Early Childhood Educator's decision making, or the behind the scenes account of our excursion for path making.

3.1. The Curious Traveller: Research Questions

- This overarching question inspired the walk to make the path of co-inquiry with children.
- How do educators exercise a teaching role in growing long term investigations with children?
- Within this context the following sub questions will be food for thought in our journey:
 - What are the tensions and possibilities in the role of Early Childhood educators in a Reggio Emilia inspired investigation?
 - How does the paradigm of child-centered practice informed by constructivism relate to the decision making process?
 - What are the structures and practices that invite and sustain collaborative inquiry with children?

- The presentation of the methods or the equipment enabling this expedition of making the road follows suit.

This case study will be conducted in an attempt to gain insights about the processes involved in pursuing a negotiated investigation with children, or Reggio inspired project work, in a child care center. More specifically, I aim at unpacking the role of the educator in this process and the rationale for the choices that are made to provoke and respond to children's meaning making. In addition, the study hopes to inform a better understanding about the structures and dispositions that invite and sustain long-term investigations with preschool age children.

Creswell (2012) defines case study as an investigation about "a program, event, or activity involving individuals". Furthermore, it can be classified as instrumental for it "seeks to deepen the understanding about a particular issue" (Creswell, 2012). This method seems fitting for the context of this study, as it concerns a group of eight children in a child care facility, the teachers, I as a visiting educator, and the scholar in residence as a research partner. The issue that we seek to illuminate is the role of the teacher negotiating responses with a partner and with the children.

Due to the strong narrative and reflective component of this research it calls for a qualitative method, as in Rolf and McNaughton's words: "Some studies have at their core the quest to describe or to understand, and then this is the case, researchers often favour qualitative approaches that encourage complexity and diversity in the research data" (Rolf & McNaughton, 2001, p.4). To engage in the complexity of this work, an extensive collection of data in the form of video and audio-taping, photographs, field notes, reflections and pedagogical narrations were used to convey and inform this investigation and the structures that facilitate projects with children.

Through documenting the children's perspectives, analyzing their observational and theoretical drawings, and artistic representations, I seek to understand the meanings that are constructed about the building as the project emerges and takes shape. As well, in line with the children's perspectives, I attempt to unpack the role of the teacher, and the choices that are made to carry out the investigation in response to the children's intentions within the avails and constraints of the context. One of the

constraints that I foresee is the newness of topical investigation with a small group of children at the child care centre.

3.2. Walking and Gathering: Data Collection

The data for this research is comprised of video and audio taped sessions with the children, field notes and notes from discussions with the co-researcher, reflections, pedagogical narrations, children's drawings, and photographs. This documentation is in line with the practices of Reggio Emilia pedagogy, in its value of documenting and studying documentation with children to make intentions, theories, questions and learning visible (Edwards et. al, 2012). The observations, deliberations, the responsively designed experiences and the documentation of children's work will be put together in a document to convey process. This will facilitate the understanding of the anecdotal format of the data analysis.

As claimed by Creswell (2012), "qualitative reports typically contain extensive data collection to convey the complexity of the phenomenon or process". It is the aim of this study to glean insights about the challenges that educators encounter in designing curriculum with children. Extensive documentation is heavily depended upon for the deliberations about ways to proceed in carrying out long term inquiry with the children.

These methods were chosen because they provide various sources of data: observations, interviews, and transcripts of meetings and video recording analysis that attempt to make visible the choices made by the educators involved.

3.3. Making sense of the expedition: Data Analysis

When the intention is to share process with other educators in the field or our story of making the road of inquiry about the child care centre building, the narrative method seems fitting, especially when the data encompassed pedagogical narrations, which are stories of practice, reflections and accounts of our struggles and joys in this process (*BC Early Learning Framework, 2008*).

For the most part, narrative methodology will carry us through the sharing and analysis of data. This narrative is constructed with fragments of reflections, children's theories, pedagogical narrations and communication with the co-researcher.

Clandinin and Connelly (1999) define narrative inquiry as:

The study of the ways humans experience the world. This general notion translates into the view that education is the construction and reconstruction of personal and social stories. Teachers and learners are storytellers and characters in their own and other stories (p.2).

In this case study, the data collection and analysis is an account of the teacher's and children's experiences of constructing meaning as we embarked on the exploration of the building. As well, the building itself then becomes a protagonist in the story, as it engaged with us in becoming a source of the investigation, simultaneously enabling and constraining our thinking and actions within its premises.

In their discussion, Clandinin and Connelly (2000), situate narrative inquiry within John Dewey's definition of experience as "*continuity*, namely, the notion that experiences grow out of other experiences, and that experiences lead to further experiences" (p.2). The explorations that we had with the children echo this sense of continuity, as we would take steps only after studying previous responses. So, it seems appropriate then to engage with narrative inquiry in this sharing of experiences.

King (1993) reminds us that stories are not truth as they are subject to interpretation. In line with this, Clandinin and Connelly (2000) assert that:

The attitude in a narrative perspective is of one doing "one's best", the circumstance, knowing all the while that other possibilities, other interpretations, other ways of explaining things are possible. A narrative inquirer creates, in Geertz' terms, an account of teaching and learning that is a "shaky and badly formed" (1995, p. 20) construction (Clandinin & Connelly, 1993, p. 31).

Following this logic, Leggo (2004) explains that:

As I make meaning out of lived experiences (my own and others) I am an Interpreter who stands between the chaos of the experience and the production of a tidy narrative that represents the experience. In the end the narrative becomes one of multiple stories (p.105).

Given its open-ended nature, the process of observing, interpreting and designing responsive experiences is complex. The interpretative nature of this work fits well the narrative method, for “[e]very story has multiple possibilities, meanings and resonances” (Leggo, 2004, p. 105). Further, I subscribe to the practice of reflectively sharing stories of children’s learning and teachers’ reflections endorsed by the BC Ministry of Education (2008). This practice is called pedagogical narration and it is defined as:

[The] process of observing, recording, and, individually and collectively, interpreting a series of related ordinary moments in your practice. The process should be on-going, cyclical and based on the art of reflection on the part of the community of learners. Keep in mind that “it is contextual and involves children in a process of co-construction with teachers” (Dahlberg, Moss & Pence, 1999 as quoted in the *BC Early Learning Framework*, 2008).

Returning to Dewey’s conception of experience that informs narrative inquiry, Downey and Clandinin (2010) suggest that for Dewey, “the goal of reflective thinking is learning to make connections between what we do and what it does to us” (p.241) The reflections that are part of the data collection are in line with this, as we can see the teacher living with the questions. Along these lines, Downey & Clandinin legitimize the choice of narrative inquiry to shed light into processes of working responsively and understanding expected and unexpected tensions and complexities. We will be indeed “muddling along”, as highlighted in the passage below:

Dewey linked the conception of learning to the inevitable muddiness that comes with muddling along: the turns that shift us from our original course of action, pointing us instead to the unexpected and unmarked routes that we then struggle to learn to navigate. Learning begins only when certainty ends (Downey & Clandinin, 2010, p. 383).

This attempt to convey the complexities of process points to narrative inquiry as a way to go in sharing the making of the path, as the data comprised of reflection, documentation of children's work and pedagogical narrations. There was a myriad of stories to tell.

Typically, in the narrative tradition the researchers would collect stories from the protagonists and then tell and construct meaning of these experiences (Connelly & Clandinin, 1990). In this study, my role is twofold as I am sharing the stories of the children, some stories about the centre, but also my story, or the role of the teacher as I collaboratively carry out an investigation with children.

I am aware that the process of narrating the stories of this year long investigation with children is but a selection of texts amidst an array of stories that unfolded and I have selected the highlights. I could share the storey about how M., the child that set the exploration in motion, would sometimes gladly join his group and at times disband, disrupting our expectation of enthusiasm for our work. In addition, I could dig deeper into the frustrations with the children who appeared not to engage with the revisiting sessions. I could even narrate in more detail the feelings of mutuality and collegiality and respect that was developed with my co-researchers (the children and the co-researcher throughout this journey). Yet, in accordance with the topic of the study and the limitations of format, I selected passages that stayed with the proposed intention of unpacking the teacher's role in long term investigations. I find Leggo's insight about the process of selection of text helpful in acquiescing the limitations of narrative inquiry as a method:

The practice of narrative research involved an engagement in the active process of writing. Therefore, the narrative researcher needs to constantly interrogate those processes in order to acknowledge the ways in which writing selects, controls, and even fabricates some stories from the multiplicity of possibilities that comprise lived experience (Leggo, 2004, p. 102).

It is my hope that because I am sharing stories of being stuck, as well as passages of big leaps and bounds that I at least in part move away from the elements of creative writing that could blur the lines of what was lived, was imagined, or was selected to convey the process.

I hope that this story refrains from becoming tall tales of adventures, bravado and conquest. It is not a model of any sort, but an account of wanderings, vulnerability and passion.

3.4. Procedures: Getting Ready to Venture

Participants: The Wanderers

3.4.1. The Children

The participants in this case study are a core group of nine children who were selected by their educators. These selections were somewhat random at the start. The educators considered the children's temperaments, curiosity and skill. Consideration was also made of gender balance, which seemed to happen naturally, a value the educators seemed to already live. At the beginning of the investigation there was more balanced gender representation. When some of the children left for Kindergarten, the core group was composed of a group of nine children, three boys and girls, six of whom participated in the project from the start, and others joined as the exploration progressed. The ages were varied, but the majority of the children were 4 to 4 ½ year olds and would be starting kindergarten in the Fall. Two of the children were 3 ½ years old.

The building has two classrooms connected by an open kitchen. Each classroom has 25 children aged from three to five years. The rooms have no doors and the two classrooms are also connected by a multipurpose space called the community room. We deliberately chose to form a group combining children from both classrooms so as to transgress the walls of classroom space, and allow the children to get to know the group that they could see and hear through the open kitchen space and on adjacent playground but could not play with due to the regulations limiting the number of children on each side of the vast two-leveled playground.

My impressions about the lives of the children at the child care centre are that they explore the building with energy and curiosity. Perhaps it is because the ample space conjures up movement or it is the impetus not to control children that affords this carefree way of being.

Most of them live in the community within a university, and for most children, their parent[s] study or work on campus. Exploring their surroundings is curriculum at the child care centre, as the children visit their community garden and the forest nearby weekly. They also spend a lot of time in the expansive risk-promoting playground with different heights, ramps and a very tall slide.

The group was composed of diverse ethnic backgrounds. All the children spoke English fluently.

3.4.2. Child Care Center

The centre has been operating for less than two years, and, as expected, it is in the process of growing pains. The aspect of newness is expressed in the state of the art building, the furniture, the team of teachers, the administration and even in the value of sustainability that engendered its very existence. Many new relationships are being formed at the time of this study, amongst the teachers, the administration, the researchers, the children and families. The spirit of research that permeates the institution, will, I hope, propel this study, but one also expects some challenges as the study will be taken in a moment of transition, when many structures, values and relationships are emerging. The modus operandi of the centre is being created in a democratic way through dialogue with the teachers, administrator, and the scholar in residence with practices discussed in inquiry circles.

I have begun this project in a moment when the initial plan to have two open classrooms, giving the children a choice of where to play was just being changed to groups of children being placed in specific classrooms with a consistent team of teachers to create deeper relationships between and among teachers and children.

3.4.3. The Building

The magnanimous building housing the child care centre is bright and airy. Through its solar panels, it produces more energy than it consumes, and it recycles its toilet and kitchen waste for irrigation.

I am interested in the process of inquiry about this new, avant-garde and uncommon space for child care centres. It has high ceilings and windows, an open classroom concept, and a community room as a shared space to play. The value of sustainability is ingrained in its conception, with building supplies sourced locally.

3.4.4. The Early Childhood Educators

The teaching team of three teachers in each classroom are in the very initial steps of learning and working within a community of practice. At the time of this study there were some staff changes, and this complicated the process of collaboration with the teachers in this study. There were a few new relationships being built at this time of transition and new teachers to become acquainted with the on-going research.

There had been some staff change; as I understand it this compromised relationship building amongst the staff. The value of collaboration is strong, but the process has been complex due to the staff changes, but also, I presume, due to the novelty of working in a research school, a paradigm new to many teachers.

All the educators are certified Early Childhood Educators having completed one year full time or two years part-time college level education. One of the educators is working on her Master's degree; while many others are seeking post basic certification in Infant Toddler and or Special Education. In their ECE studies, most of the educators have exposure to Reggio Emilia inspired practice, especially to what pertains to working responsively with children to grow curriculum. Although they are familiar with some of the practices that relate to an inquiry project with children through the arts, a long term investigation with children is a new undertaking for all, including the researchers.

At the start of the journey I was unsure which teachers would be working with us from week to week. In addition to the teachers I also checked weekly with the administrator of the centre, who participates in the monthly research meetings; and time permitting, joined the meetings to receive multiple perspectives about the project.

3.4.5. The Researchers

As a researcher, I set out to investigate the role of the teacher exploring the project with children in partnership with the co-researcher and senior supervisor of my graduate studies. The decision-making regarding the explorations with children was considered from multiple perspectives, mine, the scholar in residence and co-researcher in this study, the administrator and the ECE teachers at the centre. I also set out to engage the parents and share our perspectives. At the time of the study, the centre was in an initial stage of building the practices of parent meetings to discuss curriculum.

3.4.6. Elaine – Co-Researcher

I am a passionate teacher. Teaching is my art. I am interested in the dialogue, the contradictions, and the complexity of human beings. Early Childhood Education became a vehicle to engage with these passions.

I am an immigrant from Brazil. Besides a bachelor's degree in English and Portuguese and one in Education, I am a non-practicing provincially registered primary school teacher. I also hold a certificate in Early Childhood Education.

Since coming upon an article about Reggio Emilia pedagogy during my Early Childhood Education studies I became inspired to study it, for it spoke to interests in inquiry based learning, the arts, and schools as places of beauty. Above all, Reggio Emilia pedagogy reflected my desire to collaborate with children and teachers of living the dialogical ideals learned from my countryman Paulo Freire, who proposes dialogue and reflection for transformation (Freire, 1993).

I studied this extensively, and even collaborated with my Early Childhood Education students in the process of responsive curriculum, but there were pervasive questions about the process of decision making. I knew that teachers attempted to bring provocations for learning, listen to children and then find way to respond. I did the talk, but now I need to do the walk to glean more insights about the role of the educator in this process of negotiation. And so, I set foot on this journey.

3.4.7. Margaret – the Co-researcher

As a scholar in residence, the research partner in this study, Margaret Macdonald has been working with the teachers and administration in circles of inquiry, discussing practices and building the structures for this new centre in collaboration. This is a unique feature of this child care centre. The value of research engendered its own existence.

Like me, Margaret is also an Early Childhood Educator with interests in curriculum and is familiar with Reggio Emilia pedagogy. In conversation, we decided that an exploration about the new building housing the child care centre would be a rich pretext for curriculum, it being innovative and unique. Furthermore, we felt that our field could benefit from conversations about the role of the teacher in Reggio inspired practice. This being an emergent practice at the centre, an exploration of such kind would be mutually beneficial to the teachers, the children and to the researchers, as we would be creating practices as we moved along, or making the road as we walked. It was the intention of this study to be collaborative and dialogue amongst the co-researchers, the children, the educators and the families.

Initially I thought that the teachers would be more involved in the hands-on work with the children, but given the reality of this newly forming centre at the time of the study, what unfolded was that I naturally came to the hands on work, with Margaret's presence as a planner and documenter. We would sometimes confer from a distance while in action. It is my opinion that Margaret was a documenter and participant, as the experiences being taped were a result of our co-planning. Margaret's insights as a participant-documenter enriched the study, as she would perceive nuances that went

unnoticed by me, being so engaged with the hands-on work. The pedagogical discussions in this study therefore took place in collaboration with the co-researcher.

3.5. Conscientious Travelling: Ethical Considerations

The permission to undertake this study is imbued in the research agreement between Simon Fraser University's Faculty of Education and the child care center, a lab school.

Even though the child care centre is clearly described to families as a site of research, in the beginning of the study parents were informed about the inquiry project with the children. The child care centre has consent to use the children's photos and videotaping for research.

The confidentiality of the participants is protected using letters in place of the children's names in all the publicly shared work. We were also respectful of the children's wishes at times not to be photographed or videotaped even when these requests were perceived through body language. It was our intention to be authentic in repeating, changing or discarding activities that did not hold the children's interest. Throughout the project there was no intention to reward the children for participating. It is important to me to divulge the Reggio Emilia portrayal of the child having a strong image as powerful, curious, competent and with rights of citizenship (Edwards et al, 2012). With this in mind, I aim to convey the direct voice of the children in their quest to make meaning and to relate to others either through words, body language and other forms of expression such as drawing and drama.

I find it of utmost importance to inform the reader about my relationship with the co-researcher and with the child care center. Prior to this study, I had no connections to the co-researcher and senior supervisor beyond the reading of her articles. However, I am connected to the child care centre in many different ways, as I instructed three of the educators at the centre. In addition, the administrator is a teacher in the ECE college program that I coordinate. The child care centre is also a site of practicum placement for

this program. This entanglement of previous relations with the centre proved to be a good exercise about boundary settings and ethics of relationships in research work.

Even though long term investigations are a new endeavor to me, I come to this role as a researcher in a position of power. I may be seen as an “authority” in emergent curriculum, because this is the subject that I teach in the college level ECE program. Despite this context, I am committed to listening to other perspectives and I position myself as a learner with humility, being aware of the position of power and privilege that I hold in my relations with the centre. As I said before, I did the talk but not the walk and this humbles me.

I come from a working class white Latin American background. I acknowledge that my status as a white, middle class person affords me some privileges.

Chapter 4.

Data analysis: The Story about the path making

“Tinha uma pedra no meio to caminho. There was a stone on the path.”

(Drummond de Andrade, 1930)

The experience of revisiting for the day seems to indicate that we need to revise our strides in making this path. There was very little engagement. The children were fidgety, the space was too small. These are exposed roots, rocks and branches that make us stumble in our walk. The bumps are the path. There is no other way.

M. keeps explaining the whole process over and over. We also repeated the “poo theatre” many times. Should we proceed with more representations of the micro-organisms through clay to elicit deeper creative conceptualizations of the micro-organisms or should we move on? Should we go back to drama? Are the children ready for more? And if so, what would it be?

I must accept this disorientation. I feel too committed to the making of this road. I humbly acknowledge that I do not know how to walk in parts of the terrain.

The data being analyzed includes reflections written during the process, portions of pedagogical narrations and transcripts of conversations with children, as well as field and videotaped transcriptions. Appendix 1 depicts the whole process. It contains documentation of children’s work, teacher interpretations, responsively planned experiences and images. It intends to guide the reader through the process of growing the investigation with children. The text will present brief anecdotes from the data to construct the narrative.

As expected, such an open-ended venture, is not linear, as I took one step forward and two back. The process tells of roadblocks (structures fomenting inquiry), small steps (drawing theories, revisiting) and giant leaps (finding the children's curiosity about micro-organisms).

The data analysis will be carried out engaging with anecdotes taken from field notes, reflections, discussions with the co-researcher and excerpts of children's conversations.

Here I share the areas to be further developed in this analysis. The study demonstrates that educators have a stronger role in growing a long term investigation with children than previously understood. In order for this work to unfold, dialogical structures and the intentional exploration of the arts and sciences as languages of research are to be attended to in early childhood practice. I came to realize the power of revisiting work with children as important and rarely discussed process of framing the investigation for the children and eliciting theory making. Child-centered practice had a strong pull on my process of decision making. It afforded a state of attention to children's theories, but also constrained my decision making as many times the children's intentions were not obvious and I struggled in making a guess about ways to respond. The engagement with the pedagogy of listening is helpful, in that it acknowledges the reciprocal attempt to listen to context (values, place, interests of the teacher), as well as to the hypothesis, choices and interests of the children. I found Tzuo's (2007) proposition of the high teacher control and high children's freedom a useful paradigm to explain this conundrum about teacher or child-centered pedagogy. The teacher exercises control by acting, scaffolding, designing experience which afford much freedom to children in responding to these invitations in their own unique perspectives.

I discovered that the process is arduous but incredibly gratifying, as it propels teachers in moving out of the comfort zone laid out by constructivism, namely that of preparing the environment and watching children play. Teacher passion is essential in envisioning and setting out on the path making of long term investigations with children.

The data analysis proceeds with a discussion on the revisiting process seen that it is one of the ways that teachers exercise control by making the work visible to the children, to invite memory and propose further thinking.

4.1. Back Steps: Revisiting the work with Children

We showed the children the pictures of the investigation, a visit to the tank, their work drawing, and read their theories to invite reflection throughout the project. Sometimes we even proposed questions based on our perceptions about the latent meaning in their work. When we got stuck in the holes of the path, a few times we would draw the children's perspective to our rescue with questions based on what we perceived to be meaningful. Debriefing in partners or with one child proved to be more effective for us, due to the context of the centre, where the teachers are in the beginning stages of developing structures for dialogue for curriculum design, amongst themselves and with the children. This is how one child expressed himself during one of the revisiting sessions when looking at pictures of the visit to the tank.

M: "Oh, do you know what I think about this? Here is the toilet, and this is the dirty water. It goes to the clean water, comes back here, goes back here and there."

Elaine: "You showed us how the bio-reactor works."

M: "So it flushes. It goes right here, pop, air. It says pop, it goes down here. Oh, I remember that. Oh. We are drawing the tank."

M: "We are hearing the tank. Do you know what I think? I think that the orange things are actually the animals." I don't think they have eyes. They only have a mouth. Just like worms."

This conversation presents meaning making through the practice of revisiting. Appendix B depicts the conversations with children during revisiting, and the stories that we used to foment memory and discussion. It is opportune to turn at this point to a discussion on the role of teacher in the revisiting process.

One of the Reggio practices inherent in projected curriculum, or what we call project work in North America, pertains to revisiting as a forum for reflection and dialogue. The teacher will read back to the children their comments, show them pictures of themselves at work, and share their drawings and video in order to provide an outside view of previous encounters with people, things and thoughts (Forman & Fyfe in Edwards et al, 2012, p. 256). The conceptualization below aptly describes the process comparing it to the returning to place, which serendipitously fits with the metaphor of walking the road that ties this narrative:

Revisiting is just that, a return to a place to re-establish or to discover the significance of that place, like going to one's hometown after a long absence. As a visitor, you now look on the experience as an outsider. You no longer reside in the experience, but you seek to establish a new meaning and new feelings from that experience. You are a bit less detached as a non-resident but no less eager to be there. The past is reconstructed from the new perspectives of the present. You look for patterns to create meaning; you look for causes and relations that were not obvious while you were a resident in the experience (Forman & Fyfe in Edwards et al, 2012, p. 256).

For us, revisiting symbolized a pit stop in the walk of studying the bio-reactor. You would pause to look back at the shaping of the path. At the pit stop you can reflect about the making of the road (Carter, 2009, p. 27). As the quote above signifies you can then notice "patterns" of walking, discuss the stumbles, remember previous steps and maybe develop more questions about the unconquered terrain.

In our study there were instances of strong engagement with revisiting. At other times, when we worked in groups to revisit their work the children would not participate much or would appear uninterested. Maybe the viewing of the slides depicting their work was enough to elicit reflection. I discovered that I was expecting too much from the children, at a time when these practices were new to them. Furthermore, the centres at the time did not carry out meeting time with the children, and this too may have impacted their engagement with revisiting. Even when we suffered from the children's lack of interest in revisiting, I still find it useful in the sense that we were at least communicating an attitude of interest in their work. Katz illustrates this sense of care:

At some level that we may not be able to specify, the children are aware of what the adults really care about, what they judge to be interesting, worth doing, worth probing, and worthy of the time and their attention (Edwards et. al, 1998).

In order to in part convey this sense of connection to investigation we revisited many times:

- Visiting the bio-reactor panel more than once, and then showing pictures and comments.
- Visiting the tank a few times, and then viewing pictures and comments.
- Viewing slides about the technician's presentation about the tank.
- Visiting their drawings of the animals before representing the animals with clay.
- Sharing the story that Margaret and I composed based on the previous investigations highlighting theories, planned responsive experiences, and the general unfolding of the project.

We tried different locations to see if the space would make a difference in inviting focus and participation, but this proved to be difficult, in part due to the novelty of the meeting time with children. We struggled with this and tried many places: the loft was too distracting and noisy and the novelty of space intrigued the children, the researcher's office, the nap and the community room. The nap room was often being used so we could not reliably count on the space. We ended up doing a lot of work in the community room, which connects both child care classrooms and is vast, bright and has a theater. The space, however, was not conducive for meetings as it was not a space often visited by the children and they wanted to play with the materials. Many times our explorations were cut short so that the children could play. I share this anecdote to suggest that child care centres should think about creating spaces to gather with small groups of children to elicit focus and participation. The Reggio Emilia schools have ateliers that partially function with this purpose (Vecchi, 2010).

The idea of doing individual or partner debriefing came from V., one of the educators at the child care centre, who had tried and tested this model of individual or pair debriefing when working on a project for her ECE course.

I came to realize through this study that the very practice of sharing the images and comments about previous work suffices in depicting the teacher's interest in their work. As well, it conveys to the children the trajectories of the project. My expectations of children's participation through comments and questions were at times too high. More research in the field about the process of revisiting experience could strengthen this practice.

My perception is that very little inquiry work is done with individual or groups of children in child care centres, due partially to the constraints of ratio and custodial roles of feeding, changing and preparing for nap. However, I contend that there are moments in the day that the teachers could intentionally seek out to spend time with individual children outside the context of touching base during self-selected play. This would afford a structure conducive of revisiting.

Revisiting calls for a strong role of the teacher in inviting focus, beyond the child-centred invitation to follow the child. Within this paradigm, I would promptly abandon the experiences of revisiting at the first sight of non-engagement, deeming that the children were not interested. The long path that we constructed from studying the bio-reactor panel to performing the micro-organism play proves the contrary. Essentially the role of revisiting transgresses the norm of preparing the environment and watching children's play informed by constructivism. Finally, revisiting is very intentional on the part of the teacher, and therefore through this practice, the early childhood teacher teaches. The teacher clearly becomes a protagonist (Rinaldi, 2006), a discussion that I now turn to.

4.2. Teacher as a Protagonist

The teacher's actions doing project work with children are very deliberate because she is invested in growing the project with the children.

This claim passionately informs the role of the teacher by Rinaldi, one of the pedagogues of the Reggio Emilia Municipal schools.

And when the child dies, the teacher dies as well, because the teacher's goal is the same as that of children: to find meaning in her work and in her existence, to see value and significance in what she does, to escape from being indistinct and anonymous, to be able to see gratifying results from her work and her intelligence. The teacher cannot work without a sense of meaning, without being a protagonist. She cannot be merely an implementer – albeit intelligent – of projects and programmes decided and created by others for some “other child” and for undefined contexts. The highest value and deepest significance lie in this search for sense and meaning that are shared by adults and children (by teachers and students), though always in full awareness of different identities and distinct roles (Rinaldi, 2006, p. 56).

I was neither “indistinctive” nor “anonymous” in this investigation with children. The curiosity about project work as well as the impetus to listen to children's meaning making powered the work. In collaboration with the co-researcher, I looked at our videos. I discussed the children's responses after each session, and I debated over their interest. Despite this recognition, a tension persisted throughout the walk. This is evidenced in the constant questioning in my reflections.

Are we pushing the children to move in this path making?

Are we steering them towards one direction?

There is interest in the micro-organisms. Should we focus on the factual understanding or on the imaginative conception of the creatures?

Should we show the orientation video for the building explaining the bio-reactor as the teachers at the centre suggested? Will this feed or interrupt the meaning-making?

Should we allow visitors to our group or stick with a consistent number of children?

Are the expectations for prompt theory making too high?

I came to understand that child-centered practice has a strong hold on my practice. Despite the consistent studying of the experiences that I planned and the evidencing that for the most part children engaged, I struggled with being authentic. In a way, I was attempting to “follow the children”, despite knowing that this is not entirely

possible or productive, as Reggio Emilia suggests in portraying the teacher as a protagonist. This passage illustrates this positioning.

A determining contribution to children's construction of knowledge, we believe, is the involvement of the adult, not only because the adult legitimize children's knowledge and curiosity, but also because the adult addresses children's investigations with supports and suggestions (Edwards et. al, 1998, p. 221).

In addition, in *growing* this project (I deliberately highlight growing) the teacher does plant the seeds of inquiry by bringing a topic to attention and also nurtures the process for it to unfold. The grower is of utmost importance, for without the planting there would be no project. I find the term "growing curriculum" helpful in connoting the strong role of the teacher constructing project work. This term comes from Carter and Curtis (2009 workshop notes).

I like to propose a new term for this process of deliberation about co-designing curriculum. Because the meticulous design of each step taken require much analysis and interpretation I therefore choose to call it "studied teaching", rather than intentional teaching explained as "educators being deliberate, purposeful and thoughtful in their decisions and actions (Legget & Ford, 2013, p.2). However, I find that the term, 'intentional teaching' does not do justice to the laborious work of gathering, analysing and interpreting children's work to plan responses. An intentional educator could also be teacher-centered by purposefully planning for explication.

In the walk for path construction, the educator studies the terrain, in doing so, she will be walking ahead in terms of "conveying possibilit[ies]" (Edwards et. al, 1998, p.221). However, she keeps the children in sight, attentive to their creative ways of treading. This will inform her how to plan ventures within known (repeated experiences, revisiting) and unforeseen territory (the surprises that the children bring to the inquiry).

4.3. Leading the Way

Tzuo (2007) illuminates the conundrum of children's ideas driving practice by reconceptualising child centered pedagogy under the control/freedom paradigm in teacher's and children's actions. She rejects the high children's freedom and low teacher control that child-centered practice presupposes, advocating instead that two seemingly opposing models can co-exist according to the demands of each situation, namely the needs of the children and the learning context, being values of the centers, resources available, place, and time of the work, and the ages and temperament of the children. This paradigm is explained below:

Children's freedom does not mean freedom from any constraint. Instead, children's freedom means children have freedom to participate actively in the curriculum. The purpose of teacher control is not the rejection of children's freedom. Instead, children's free participation is important to adjust her vision and adapts her guidance to help them develop based on their individual needs. Therefore in the teaching process, neither teacher control nor children's freedom dominates; one is not more important than the other (Tzuo, 2007, p. 38).

The only constraint to this argument is that as a protagonist, I would give the position of the teacher more emphasis, not as in "dominating" which then equates her to the conservative teacher-centered paradigm, but as keeping the walk abreast with an expectation of collaborative path making. Without this expectation, there is no freedom to walk far.

In line with the vision of making a path in our project, the children were valued in having a choice of movement as in articulating theories, fantasizing, and creating play scripts. The teacher would invite and attempt to sustain engagement by meeting the children's intentions, so they would not drift away from the making of the path. I would provide suggestions within individual walking styles to stay together on the path, to slow down the walk, to look back and examine the routes, capturing the openings (children's sympathies, theories and imagination) and exits (experiences that paralyzed our steps: clay representations, paper for costumes, lack of engagement with guided drama). Sometimes the children would lead the walk by proposing, for example, a visit to the bio-reactor tank, conceptualizing the bacteria creatively through drama, and creating a script

by playing with props. Other times, we were ahead by revisiting sessions, or the invitations to draw the tank. I am not suggesting that there is balance. In essence I believe that the teacher was the one holding it all together. In the commitment to the making of the path by walking, the educator is ahead most of the time, but democratizes this role in making decisions in attempting reciprocity to the children's interests. She decides however from the array of possibilities the ones that are most valuable to the children and to the context of the investigation, which in our case was engaging with an environmentally sustainable building. Biesta (2012) proposes that the teacher is essential, as the teacher acts as judgement maker.

[The] teacher plays a crucial role because at the end of the day judgements about what is educationally desirable can only be made in response to the concrete and always unique situations that emerge from the encounter between teachers and their students (Biesta, 2012, p.40).

One of the ways that early childhood educators teach in the context of projects with children is by making judgements about the children's contributions. In this sense, co-constructed curriculum points out to the strong role of the teacher in learning, as these judgements are not possible within a "learn on their own" constructivism approach, where the teachers take the back seat. She is very much a protagonist. Without this judgement making our investigation would not have taken place.

Appendix C provides an example of the judgements that were made according to the "concrete and always unique situations between the students and the teacher" (Biesta, 2010, p.40). It situates the work within Tzuo's (2007) high teacher control and high children's freedom to engage with the curriculum.

As I reflect on Tzuo's conceptualization of freedom with constraints, I can see that the process of this project reveals an understanding of this vision. The roles of high teacher control and high teacher freedom were exercised in our project in the context of listening to our pedagogical values and the children's sympathies. Therefore, it is not teacher or child centered, but protagonist centered, in the sense that we had mutual interests in this endeavour. For the children, the interest could be the joys of having voice, of being co-creators outside the context of child selected play. The gratification for myself as a teacher was in the joys of transgressing the boundaries of everyday

practice of preparing the environment and watching children play. In addition, I was pursuing a value of sustainability, which was the valuable intention of the centre's pedagogy. As well, project work created a space for the children and the teachers to participate in an "intellectual dialogue" (Rinaldi, 2006, p.), what Rancière (2009) calls the "becoming of conscious of his [or her] nature as an intellectual subject (p. 35).

Clearly, the children are not "in charge by controlling the content (his/her interests) and timing of learning" as child centred practice suggests (Canella, 2002, p.118). The teacher makes decisions based on the pedagogical values while considering what the children bring to the equation.

I believe that Reggio Emilia pedagogy with its proposition of listening can solve this conundrum of child centered and teacher centered paradigms. We listen to the children but we also listen to ourselves (Rinaldi, 2006, p. 65). What Reggio Emilia practice suggests is that listening is teaching.

4.4. The Beaten Path: Troubling Constructivism

I do not want this to become a traditional constructivist study of the bio-reactor, where the children simply come to understand the system of waste water recycling. This is too narrow a purpose. Is this important for the children? How does knowing the recycling system enrich their lives? I hope this becomes a project of wondering, to model an attitude of collaboration in theorizing with others, to express curiosities, sympathies and wonder. I need to avoid the trap of guiding the discovery of what is already there. Am I going to end up making a narrow path as done with my students in the Grade 2 sources of energy project? The study was done through hands-on experiments with theorizations, but this did not make way for imagination. I must capture the imaginative ways to tread on this walk. This is for me a strong provocation from Reggio inspired practice, this honouring of the symbolic and playful realm of children's experiences. Reggio pedagogy is so committed to the essence of children's ways of being that they can turn an exploration of space into a child created choreography, and a study of luminosity into a light catching machine (The Wonder of Learning Exhibit Catalogue, 2011). This homage to imagination is one of my intentions for this project.

The findings of this research suggest that within the constructivist conceptualization of teachers facilitating learning, open-ended long term investigation with children is not possible. Its very existence relies on the teacher's intention to frame it as subject of study, modelling a disposition for long term inquiry. The teacher's work is more intentional than that of the facilitation inferred in constructivist pedagogy. To document, deliberate and design experiences to respond and challenge to me signifies teaching.

Likewise, the child-centered nature of constructivism entails that the teacher essentially follows the child. What I found is that there are many moments within this project when the teacher took the lead, while making judgements based on documentation of the work done by the children. It is a form of what I call studied teaching, or what the field has referred to as "intentional teaching", the what, how, and why we teach" (Legget & Ford, 2013, p.2). The work of the educator involves "apply[ing] insights in ways that determine how best to initiate, and sustain interactions with students. I purposefully highlight the words "initiate" and "sustain" as they are very much associated with the practice of teaching.

Loris Malaguzzi acquiesces that the constructivist paradigm "undervalues" the roles of the adult. Through the metaphor of the ping pong match between the child and the teacher, Malaguzzi cautions educators that at times the teachers play a little harder to sustain the game (Edwards et al, 2012, p.48).

As I understand it, one of the ways that educators exercise teaching in Reggio Pedagogy, is in attempting *to provoke and apply children's natural capacity to imagine*. This does not refute factual knowledge and the practices of discovering by doing, but it assigns more value to imagination. The projects displayed at the Wonder of Learning Travelling Exhibit (Vancouver, 2012) reveal this homage to creativity, where an inquiry about sound on a staircase (listening, documenting, comparing) leads to audio taping of child created sounds to counteract the "stair's loneliness". Similarly, the exploration of columns unfolded into clothes to make them beautiful (*The Wonder of Learning Exhibit Catalogue*, 2012).

In the context of this study, the children observed the bio-reactor tank and the panel and attended a informal presentation by the technician, drew from observation and from envisioning process, listened to and smelled the tank, constructed theories about the functioning and the micro-organisms, enacted the bacteria by playing with the props about the bio-reactor and ended up performing the co-constructed play script that evolved. We can see here interplay between scientific and artistic explorations, when the children learned facts, developed theories but also employed their imagination to describe and enact the bacteria they had not seen. One of the highlights of this study is in the teacher's finding, capturing and bringing together the unique imaginings of children into a play, which signaled the apex and the end of the path making. Appendix 4 gives details about the unfolding of the play.

In our case, I could have stopped the inquiry when realizing that the children constructed meanings about the bio-reactor system, a typical response, as I understand it, within a constructivist vision of curriculum. Yet, informed by Reggio Emilia pedagogy, I found it too narrow a purpose. I was committed to trying the walk the Reggian way, in finding a piece of imagination to further it with the language of drama.

I contend that in the field of ECE the creative ways to connect the project into a piece that represents children's imaginative ways of meaning making is an area of further study in the field. I equate the representative piece bringing it all together, factual knowledge, discoveries and wonderings as the "something new" coming into the education situation that is in the hands of the educator, making her indispensable. Biesta (2014) helped me come to this understanding.

Against the idea of the teacher as a fellow learner or as a facilitator of learning", I will suggest that we should understand the teacher as someone who, in the most general sense, brings something new to the educational situation, something that was not already there" (p.44).

The decision to challenge the children to go beyond knowing the bio-reactor system points to the essential role that teachers play in long term investigations, that of "bringing something that was not already there", which, in our case, became the imaginative conceptions of the animals and the play that unfolded. In this context,

scaffolding children's representations of knowledge is one of the ways that early childhood educators teach.

4.5. Social Constructivism

We were outside on top of the tank and the children were drawing their understanding of what transpired inside the tank, without having seen it. A. asks to join the bio-reactor group. As I mention the panel, she asks to see it. I then suggest that M.I., a child in our group chaperone the visit to the control panel inside the building.

A. and M.I. look close and trace their fingers on the lines and drawings depicting the system.

- A.: "Look, the bubbles. The bubble is coming up in the water. The bubble is coming up in the water." She repeats
- Elaine: "The bubbles in the drawings that you have."
- A.: "The bubbles are coming up and pop in the water."
- Elaine: "I wonder what happens when it bubbles?"
- A.: "Why do the lights go swish? Why do the lights go on and off?"
- Elaine: "Why do the lights go on and off? M.I., you have something to say?"
- M.I.: "The pee and the poo goes through here."
- Elaine: "The pee and the poo goes through here."
- M.I.: "And then it goes up and down and up here."
- A.: "I was making that one". (Does she recognize that she too had the same understanding)? M.A, come here, you did the drawing too."
- M.I.: "This is "'electricity' and the 'electricity' makes the poo and the pee get burned."
- A.: "And I think this and this." (She points to the lines of the tank on the panel)
- Elaine: "Do you think they are connected?"

The excerpt above depicts one of the moments of scaffolding in this project. I came to realize that perhaps due to the gap in research in the role of socio-constructivist teaching denounced by Kontos (1999), I am not skilled at this practice, as in analysing

the transcripts and video-recordings in attempting to elicit inquiry I asked too many questions. Other times, I managed to keep focus by repeating what the children were saying or pausing. Refer to Appendix B for the transcripts of my conversations with children. These conversations with children reflect Jerome Bruner's description of scaffolding described earlier in Smidt (2009), highlighting the following strategies:

1. *protect* the learner from distraction by highlighting the significant feature of features of the problem;
2. *sequence* the steps to enable understanding;
3. *enable* negotiation between teacher and learner;
4. *know* just what it is that the learner needs in order to succeed.

Protecting the learner took place in repeating the child's comments. Negotiations were enabled when the child mentioned the bubbles and I then asked her its functions. Finally, I tried to engage another child in the conversation, judging that they could provide peer scaffolding as he was the mechanical mind in the project, making detailed drawings of the bio-reactor system. I situate the concept of scaffolding as the "intellectual dialogue with the children" that Reggio Emilia pedagogy (Edwards et al, 1998, p. 181) advances. Besides the conversations with children, in broad terms, I situate the role of the teacher scaffolding within what Malaguzzi calls "a pertinent expectation":

In trying to make a good project, one has to have, above all, a pertinent expectation, shaped in advance, an expectation also felt by the children. This expectation helps the adults in terms of their attentiveness, choices, methods of intervention, and what they do concerning the relationships among participants (Edwards et al, 2012, p. 54).

This re-iterates well the previously discussed premise that one of the roles of teachers in ECE practice is to "initiate" and "sustain" engagement (Legget & Ford, 2013, p.2). I deliberately called the children in this study the bio-reactor group, highlighting that we were researchers. The practices of revisiting kept the topic afloat and the designing of experiences based on documentation, together with the action of constructing meanings with peers, make visible the process by which early childhood teachers teach.

I wish to reiterate that in the context of project work, teachers teach, and one of the ways to do so is by designing experiences that provoke and respond to children's intentions, a discussion that I now turn to.

4.6. Negotiating the Routes: Walking and Talking in Multiple Languages

One of the stumbling blocks in the making of our path was the invitations for meaning making through the exploration of artistic languages such as drawing, designing with clay, and dramatizing. Selecting these forms of expression was more challenging than expected, as at times the routes to take were not so obvious. I am aware that Rinaldi's (2006) pedagogy of listening defies this certainty and yet I felt vulnerable and worried, with much more discomfort about not knowing how to proceed than previously expected. As we can see above, the children's responses defied my predictions. I invited them to draw their images of the micro-organisms big so that they could add details and also share it with other children. Yet, apart from two children, they mostly drew them small and hiding inside the tank with water movement, and pipes connected to toilets. The invitation to think through the arts, what Reggio Emilia pedagogy pens as 100 Languages, formed the design for the path making, in that it afforded a variety of ways to think. Vecchi (2010) defines the 100 languages as:

In Reggio pedagogy, a choice has been made to extend the term language beyond the verbal and consider languages as the different ways used by human beings to express themselves; visual languages, mathematical language, scientific language, etc. In a conversation on the relationship between pedagogy and atelier, Claudia Giudici, *pedagogista*, puts it like this, "When we speak of languages we refer to the different ways (human beings) represent, communicate and express their thinking in different media and symbolic systems; languages are the many fonts or geneses of knowledge". Poetic languages are forms of expression strongly characterized by expressive or aesthetic aspects such as music, song, dance and photography (Vecchi, 2010 p.9).

I was committed to explore the building by walking and talking in different ways, especially through drawing, which, together with drama, afforded the most expressive and graceful movements in our walk. Progressively, the drawings richly detailed what the children learned through the observations they made, presentations by the technician,

their own theories and observations of their peers' drawing. Drawing the panel, the prediction about the functioning of the tank, and the envisioning of the micro-organisms led to strong meaning making. The images below convey this process.

The documentation of each process of expressing multiple languages, revisiting sessions and moments of nurturing the investigation with facts and the deliberations that were made is presented in Appendix A.

Since drama proved to be a powerful language to convey the children's imaginative conceptions of the micro-organisms, I will discuss it in more detail. We revisited the technician's presentation and the observation of the open tank through images. The children had learned that the micro-organisms clean the water, and became intrigued by them in the revisiting session. Considering that the children in the group were quite active, we decided to offer guided visualization about the technician's presentation and observation of the tank using the general fact learned that the micro-organisms clean the water. The children extrapolated from the narration, adding elements of playfulness to the context, escaping the tank, making noises, pretending to eat toilet waste, slithering and crawling and even sleeping. This was the genesis of the play about the micro-organisms. We repeated this visualization many times, adding to the narration the elements that the children added to the plot, such as escaping the tank, playing hide and seek and hungrily eating "poo" and drinking "pee". Children had different ways of embodying the organisms, crawling, creeping and slithering.

Because drama is not commonly explored outside child initiated dramatic play, I was curious about its application as a language to construct and express meaning about our topic. It did become a powerful language in which to convey the children's unique conceptualizations of the "animals". Below I convey the affordances of the language of drama, as I rarely see its application as a language of inquiry.

4.6.1. Walking and Playing

I contend that the children were fluent in the language of drama, through their every day pretend play. As a result, it facilitated rich expressions. Fact and fantasy came together in the form of the “the animals that eat the poo play”. Through drama, the more scientific explorations of observing, and drawing, and theorizing about the functioning of the bio-reactor came to walk hand in hand with the arts. In the walk to construct the path of inquiry, here there was giant leap. I argue that here it seems that I manage to follow some of the footprints of Reggio Emilia, in pulling different steps (drawing, working with clay and orally theorizing) into a significant stride favouring imagination. Pincotti (1993) informs the affordances of creative drama in the way that I applied it.

Creative drama is an encompassing learning medium, emerging from the spontaneous play of young children and utilizing the art of theatre to build and enhance the participant’s artistic sensitivity, awareness of self, other and the world, and develop each child’s dramatic imagination. Creative drama is a specific type of dramatic learning activity and it is guided by a leader and allows the participants to enact, and reflect upon human experience, real or imagined..... These dramatic learning activities nurture and develop both individual and group skills and enhance the participant’s abilities to communicate their ideas, images and feelings in concert with others through dramatic action (Pincotti, 1993, p.24).

Pincotti’s appraisal of drama as a legitimate form of learning substantiates well the choice of experimenting with drama as one of the languages that sets us in motion for path making. I believe exploring drama to connect with and think further about the micro-organisms proved to be a rich choice. The children seemed to develop a strong connection with the micro-organisms as they became them, being playful (hiding), naughty (escaping the tank) responsible (cleaning the toilet waste). This “artistic sensitivity” that Pincotti mentions above did not fully manifest itself through drawing, clay or words. Likewise, it was a challenge to describe in words creatures that the children had not seen. Because drama allows for movement and sound, the children’s conceptions of the bacteria become more detailed and experimental. Their enacting could be changed in action, in this seemed to present a bigger challenge through other media.

Drama moved us in the following ways:

- Guided Imagery. Repeating in simple steps what the technician had told the children (toilet waste goes from the tank to the toilet, the water in the tank moves and makes bubbles and the micro-organisms clean the water). At the children's request this was repeated many times. Playfulness emerged: with micro-organisms crawling, jumping, slithering, escaping the tank and sleeping). After a few repetitions, the role of the technician entered the story.
- To deepen their conceptualizations, children are invited to embody the micro-organism into a pose.
- Many sessions about "playing micro-organisms" unfolded, with children adding to the script. The teacher takes notes about the emerging script.
- We brought props mimicking the bio-reactor when perceiving that the children were losing interest and that the "play" became repetitive. These were hoses, faucets, tubes and a toilet, brown cloth to delineate the tank and the technician's equipment as such rubber gloves and the container to collect water samples.
- Children brought more props from the adjacent storage room, adding details to the story (small baskets and later pinecones to represent toilet waste, and small boxes as medicine for the animals.
- We revisited with the children to provoke a more detailed conception of the micro-organisms. We narrated our previous encounters with images and asked their thoughts on the looks of the animals.
- The actions of the children's play sessions are combined to the children's fresh insights into a script that the children called "poo theatre".
- We perform it to signal the end of the investigation and also to share the learning with peers and parents.

In the children's embodiment of the micro-organisms I perceived what Fels and Belliveau (2008) call "moments of recognition":

Something happens when individual and shared worlds of experience, knowledge, memory and performance intersect. Imagination, experience, and inquiry collide, resulting in startling moments of recognition. These moments of recognition, or what drama educators call "aha"! moments, are moments of learning. Performative spaces are action sites of learning where children and adults bring into being new understandings, new recognitions and new possibilities (Fels & Belliveau, p. 29).

We can see from the images of children impersonating the animals, a variety of understandings about their anatomy and behaviour. A context of “recognition” reveals itself through experience (previous enactments and drawings); “knowledge” (the insights constructed such as they move differently from humans, slithering, crawling, jumping “memory” (our previous performances, the revisiting sessions, their analogies with other “animals”, mostly looking like insects, molluscs (snails) and fish (an interesting connection as the microorganisms live in water; and finally, recognition is perceived through their performance (bending, jumping, stretching, creeping, slithering and crawling). Seemingly, all these experiences came together to express a knowing, a wondering and a sympathy. Although we considered showing the children a brief video clip of microorganisms eating, I am glad that we didn’t in the end. Clearly, the absence of images left the space for deep wonderment. This was a moment when our judgement yielded a rich response by valuing imagination over factual information. I think that there is space for sharing facts, as long as it opens the way for creative inquiry. In a way, I avoided what Paulo Freire calls “banking education”, when an educator fill up children’s minds, when the teachers talk and the students listen or when “the teacher knows everything and the student knows nothing” (Freire, 1993, p. 54).

In a rare occasion when the process of a Reggio Emilia project is presented in more detail, Rankin shares that once the teachers gathered from the children their knowledge and their questions about dinosaurs through conversations and drawing, the teacher brought books about the topic to nurture the investigation (Edwards et. al, 1997). Asking children’s questions at the start of an investigation would be considered too directive for child-centered educators. My point is that in Reggio practice the teachers make no apologies for applying strategies that will provoke inquiry, even if is providing

information at some point in the project. In our context, the guided visualization about the processes of the tank provoked imaginative conceptualizations about the micro-organisms. Within Tzuo's paradigm, I exercised control in applying drama as strategy to generate inquiry. The children exercised freedom by taking the invitation and making it their own, by playfully representing the bacteria.

In this long and winding road of investigating the bio-reactor, fantasy and rationality came to co-exist. This interweaving of imagination and rationality is partaken by Rinaldi (2010) when engaging with Gianni Rodari's thoughts on fantasy:

Gianni Rodari was one of the finest supporters of how fantasy and rationality, cognition and imagination take strength from each other and how above all, in education we must make them interweave, make them dance together (Rinaldi, 2010, p.118).

What I came to understand is that the caution in avoiding traditional roles of the teacher as a dispenser of knowledge is productive, as it could suppress children's strong voices and their urge to make meaning creatively. On the other hand, the hands-off approach in waiting for everything to come from the child can by the same token hinder a process of inquiry. Why walk on a plateau if the children can and want to hike mountains?

4.7. Advances, Standstills and Retreats: Rest in Making the Path

I can see the value in Margaret's proposal to pause and reflect in order to study our documentation, gather multiple perspectives and analyse the many possibilities before taking action. Listening does take time (Rinaldi, 2006). The thing is I am bothered about is not knowing how to proceed. Is this because I do still subscribe to the image of the teacher as all knowing? Or is it because my passion for this type of work

compromises the standstill required to study the work, reflect and take a breath in the walk? Will the children drift off the path? Are we stuck?

Project pauses are common practice in Reggio Emilia pedagogy. This is conveyed by Rinaldi (2006, p. 103):

Learning does not proceed in a linear way, determined and deterministic, by progressive and predictable stages, but rather is constructed through contemporaneous advances, standstills and “retreats” that take many directions.

We put the investigation to rest. The children conveyed a strong interest in embodying the micro-organisms. I was however unsure about how to proceed at this point. Although negotiated, I had an agenda of furthering this investigation with the children. As a product of deterministic education, letting the investigation rest was unsettling for me as a teacher, even though I typically avoid hurrying children. The direction at this point was unknown to us so stopping and reflecting was called for. Rinaldi further highlights this non-linear process of negotiated investigations with children:

The word “project” evokes the idea of a dynamic process, and itinerary. It is sensitive to the rhythms of communication and incorporates the significance of timing of children’s investigation and research. The duration of a project can thus be short, medium or long, continuous or discontinuous, with pauses, suspensions and re-starts” (Rinaldi, 2006, p. 132).

I believe the nonlinear aspect of project work needs to be further illuminated in the ECE field. The presentation of Reggio or Reggio inspired projects reveal the teacher’s responses to the children’s intentions, neglecting to share the pauses, setbacks and other areas of struggle. This tension is expected but rarely conveyed, and my hope is that by sharing our doubts we would demystify this process for Early Childhood Educators towards acceptance of the entailed risks and possibilities for teacher and child learning through project work. Rinaldi (2006) espouses a condition of vulnerability in the teacher’s role:

As teachers, we have to carry out this role in full awareness of our vulnerability, and this means accepting doubts and mistakes as well as allowing for surprise and curiosity, all of which are necessary for true acts of knowledge and creation (Rinaldi, 2006, p. 125).

This vulnerability is conveyed in the reflection that the pause engendered, where I ponder about offering resources to unknot the project by studying two other documented investigations: *The Scent* (Cadwell, 2003) and *Embracing Snow* (Hendrik, 1997). Refer to Appendix D. to engage with the deliberations that I made during the pause such as for instance, the decision to revisit the work with two children at a time, instead of working with the whole group to elicit focus. In addition, the pause nurtured the question about the investigation inviting and responding to children's "inner symbolic life" (Cadwell, 2013, p. 56). In this case, seemed to be the sympathy for the micro-organisms that were small, powerful (cleaned water), funny (ate poo, escaped the tank) but vulnerable (got sick when there was no waste to eat).

I learned that revisiting is a powerful practice in resuming an investigation. Rather than planning a responsive experience during the Winter break, we re-started the exploration by showing slides of the work done to that point, to provide a memory and invite fresher insights. The centre being closed, the animals lacked waste to clean and got sick as a result. This fact was shared by one of the teachers at the centre. The children then added this to their micro-organism play. Here I highlight a moment to another fact that nurtured the investigation, another moment of direct teaching that I came to accept as a possible practice in the context of a long term-investigation. The pause did not compromise the investigation. We brought the children's attention back to the project by revisiting previous work with images. Again, revisiting proved to be a valuable strategy to the path making of project work.

The pause acted as a passion tamer. In the commitment to make the path, one can lose sight of the terrain, wanting to arrive at a destination without much attention to the landscapes and the grounds being walked. I will discuss the affordances and constraints of passion later in this analysis.

I wish to advance Rinaldi's (2006) proposition that project work that pauses can be a helpful practice in the context of a long term investigation. Firstly because it affords time for the teacher to think through the trajectory; and also normalizes a state of vulnerability in how, when, and what to teach. I am not sure if pauses are a common practice in the context of long term investigations outside Reggio Emilia. If this is the case, then our field has done little in acquiescing and promoting it. This study hopes to feed this dialogue. Walking the path of long term investigation is not a marathon race but a steadfast walk with nurtured by resting stops and at times by walking poles, or structures that facilitate this work, something which is addressed in the next section.

4.8. Walking Poles: Structures that support long term inquiry

I fathom that drawing theories may be a skill that the children already have from previous work done at UCC, for there were no challenges in drawing the functioning of the tank from memory and drawing the panel from observation. Some of the drawings even included the pipes that carry the dirty and clean water! Good envisioning at place!

If thinking through the arts is an intention, this is an area of the curriculum that needs to be regularly pursued so as to enable the children to speak articulately through this language. This is one of the foundations to foster inquiry.

This study suggests that in order to co-construct project work with children, child care centers ought to develop structures and practices that foment and sustain inquiry. A reflection about the challenges that we had regarding structures is conveyed in Appendix E. It is important to acquiesce that this study took place in a new child care centre, undergoing the growing pains of inhabiting a brand new green building and a team of new teachers forming relationships and developing dialogue in designing curriculum.

The co-researcher and I debriefed the explorations soon after implementation, and then after deliberating over it for a few days, decided on the next course of action. This collaboration enabled and sustained this investigation, as we had each other to lean on when the terrain became treacherous. Not only did this dialogue inform our decision

making about the process but also fostered a strong commitment to our work and the strengthening of our relations. Apart from the joys of meeting the children and research partner weekly, discussing the work became the highlight of my week, as it generated so much discourse about practice. I would come out of these sessions with a myriad of ideas for future research, such as the power of space in our explorations, and drama as a language of inquiry.

We were hoping that strong collaboration would unfold between the researchers and the teachers at the centre. The centre was involved in inquiry circles with the scholar in residence, but this being a new centre, the practice of growing curriculum collaboratively was in its infancy. We did not know what exact role I would take in this investigation, being a pedagogical mentor or a co-teacher. It was decided by the administration that the teachers would take turns attending the weekly sessions and the meetings with the children. This was starting to take shape, but then this fell through for many reasons. There was much staff transition during this time, as the centre had gone through three different head teachers during this ten-month investigation. As well, there were some tensions with staffing in one of the classrooms. We had to navigate through these tensions, finding ways to involve teachers, but at the same time safeguarding the path that was being made. Looking back, it would have been productive to work consistently with one teacher who would be the liaison between us and the teachers at the centre.

Half the project was carried out with first hand perspective from the teachers through meetings and attendance to our sessions. Appendix F illustrates the contribution of the teachers at the centre. Towards the end, the direct participation stopped, with perspectives shared informally through conversations. In three of the inquiry circles we shared the pedagogical narrations and documentation of the work seeking support from the teachers, but these meetings stopped in the middle of the project. There were other pressing matters needing attention at the time. My aim was to build the structures of dialogue as we walked the path. This proved to be too ambitious a task.

Another issue regarding dialogue relates to children's learning skills for discussion. The children in this research group had challenges focusing and conversing

at our group meetings. They wanted to be there, but because group time was an irregular practice at the centre, the skills for dialogue such as turn taking, listening, agreeing and disagreeing were new. On the other hand, since drawing was a common practice at the, centre, it afforded rich inquiry. Dialogue with children in groups is essential in promoting inquiry in project work.

What I discovered through this process is that this long term investigation was a very ambitious project given that the foundations facilitating this work were in its infancy. The findings of this research suggest that child care centres ought to strengthen the practices of dialoguing about curriculum in order to work responsively. A way that this could be done is to have teachers informally discuss day to day preparations about the environment in response to the unfolding of each day, to the pedagogical values of the center, and the skills for representation, relationship building, and inquiry. The child care centre participating in this research does allocate time for teachers to meet and this is absolutely essential for collaborative project work.

Space for children to meet is also a factor in sustaining investigations. We tried different locations, and found that each space dictated a way of being. The small research office brought children together with minimal distractions, but it was too small and the children got fidgety. The loft with its affordances of seeing the play rooms from above was too alluring. The community room with its expansiveness invited large movement. The nap room proved to be the best working space, as the children could move, as young children often do and need too, without being disrupted by objects. We are to be thoughtful about creating spaces conducive to meeting with small groups of children to delineate an attitude of research. Reggio Emilia centres have ateliers designed with this purpose (Edwards et. al, 2012). As our child care centres are not built the same way, we are to be creative in finding solutions regarding spaces to meet.

Since the place of research was working on defining its practices when the research took place, the exploration of the arts as a form of inquiry was emerging. Thus we had challenges representing the images of the tank and the animals through clay. The children did work with it, but only a few took the invitation to represent with purpose.

Some made ballerinas when the focus was the micro-organisms! Other times, instead of representing the micro-organisms as proposed, they chose to play with clay.

We also came to understand the power of drama to represent understandings. The children in our group were quite energetic and drama afforded them a form of expression that captured their desire to move and play. Many theories about the life of these beings in the tank were conveyed through drama. It is my contention that drama has a strong potential as a language of inquiry, beyond the self-initiated fantasy play that is curriculum in early childhood education.

Together with the practice of revisiting work previously discussed, for long term investigations to unfold, educators ought to build practices of dialogue amongst themselves and the children, and enrich inquiry through the arts by engaging with different forms of representation. Furthermore, it is important to consider the dynamics of spaces to meet as they communicate a way to behave. This study shows that teachers carrying out long term investigations need to pay attention to the structures that facilitate this work.

4.9. Is Talking the Only Walking? The Supremacy of Oral Language

Are the children theorizing? Are we listening? What is the question that we are pursuing in our project at this point? We know that the animals are the children's sympathy. What is their question pertaining to the animals? How do we find out? Debriefing one on one or in groups of two? Children's theories need to be at the forefront of this investigation. They do not say much in the revisiting sessions when we ask questions or make comments. Perhaps representing the animals through clay or having each child photograph each other in an animal pose may invite more conceptualization and inform us about what it is about the micro-organisms that intrigue them.

The children were pretending to be the micro-organisms and their play script did suggest theories about their lives in the bio-reactor: playing, hiding, moving in different ways, being naughty escaping the tank. Yet, the reflection above highlights the

legitimacy given to the oral language as a form to construct meaning. To pose as a micro-organism or to represent them in clay already reveal theories about the ways they conceptualize the bacteria. Yet, I was searching for verbal articulation, which reveals that although I designed inquiry through different languages such as drama, clay and drawing, I was hoping for oral definitions about the bacteria.

This research informed my privileging of the oral languages over the graphic and performing languages that the children communicated through. I do see the power of the children's drawings, their posing and enacting the micro-organisms, yet in our revisiting session I provoked the children to articulate through words their theories about their looks and behaviour, which in fact sometimes they obliged. The drawings and dramatizations afforded many theories. Yet because most of the theories were conveyed through pretense and drawing I failed at times to acquiesce the theorizing. I expected articulation through spoken language. In retrospect, we could have asked the children to draw the "animals" one more time and use colour and details about their body, extrapolating from their initial conceptions represented with sharpies. Yet, in the revisiting session we asked the children to articulate it in words. Sagaciously, rather than answering our questions about the bacteria appearance, M. showed us by embodying the creature. He taught me that not everything can or should be expressed in words. I invite educators to further their awareness about giving due value to the non-verbal ways of communicating.

The supremacy of oral language is perhaps due to influence of the essentially logocentric nature of learning, as pointed out by Lenz Taguchi (2001), who presents the relational materialist perspective as an antidote to privileging of oral language. She explains that a relational materialist approach focuses on what emerges as an effect of the intra-activity that takes place *in-between* children and material artefacts and that interaction may not translate into words. Lenz Taguchi adds that in Reggio Emilia pedagogy, "the spoken language still prevails as the 'language' given the highest value and used as a tool for representing the learning taking place, even when the children are exploring through other languages" (Lenz Taguchi, 2011, p. 47).

I acknowledge the agentic nature of the artefacts. Adding props to the play about micro-organisms revitalized the play script. The children then started hiding, medicating the sick micro-organisms and using the toilet to feed these beings. Actions, more than words, prevailed in the three encounters with the materials.

I realize that to further trouble the logocentric tendency of our investigation, I could have just relied on the children's actions to define the play. Yet, I transcribed their actions and narrated them back to them to adhere to a theatrical convention of scripting. There is no doubt that, in doing so, I privileged oral language over other forms of expression. The play could have been a repetition of the previous actions with further improvisation. Besides, even though there were emerging theories in children's drawings, I was not satisfied until the theories were orally expressed. I do the talk of valuing the many forms of expression, but ironically, in practice, I don't do the walk, for I privilege the oral language.

Lastly, the reason behind this conundrum may be that socio-constructivism situates speech as the utmost form of meaning making (Vygotsky, 1973). As a result, it is not surprising that teachers may not be convinced about children's actual meaning making until it is expressed orally.

4.10. More than One Way to Tread

This building does not have an atelier like Reggio Emilia. There is not space to convey group time to do research. This is why the children have challenges focusing when we gather. As well, we do not have the support of an art teacher (atelierista) as in Reggio Emilia to support us in strengthening children's ways of representing. My research partner reminds me that we are not in Reggio Emilia. We work with what we have.

This reflection highlights how much I yearn "to be Reggio"! Reggio Emilia pedagogy has captured the imagination in many practitioners, with an awe-inspiring tone (Johnson, 1999, p. 65). We are cautioned by Johnson (1999) that Reggio is becoming a regime of truth in ECE practice. This regime is defined as:

The types of discourse which it [field of ECE] accepts and makes function as true; the mechanism and instances which enable one to distinguish true and false statements, the means by which each is sanctioned; the techniques and procedures accorded value in the acquisition of truth; the status of those who are charged with saying what counts as true (Johnson, 1999, p. 69).

This study made me realize that my passion for Reggio inspired practice at times clouded my judgement about our own contexts, as many times I was cautioned by the co-researcher to consider our differences. I blamed the absence of the atelier as a space for research when representing through the arts. I resented that the children were not used to working in small groups, and regretted that we were simultaneously applying the role of teachers, *atelierista* (art teacher) and *pedagogista* (pedagogical mentors), that comprise the pedagogical team of Reggio Emilia pedagogy (Edwards et al, 2012). Many times I felt that our work was not Reggio worthy; failing to foment interesting conversations amongst the children, or invite focus on an investigation. Obviously I was seeing the Reggio way as the right way. I do not want to negate the impact of the various level of expertise and mentorship offered by these professionals that I came to admire, but it is not a reality for us at this time in practice to be like Reggio, so we have to walk our own way.

Calling a project “Reggio inspired” is a broad term and it requires further definition about how one interprets Reggio (Carter 2009). In our case, Reggio inspiration meant that two teachers worked collaboratively to grow the investigation. We took from Reggio Emilia the idea of inquiry through artistic languages, small group work, the practice of revisiting, children’s theory making, and the value of documentation to inform decision making. Basically, we applied our understandings to the context of our practices. The grouping was consistent for the most part, but we embraced the children that voluntarily asked to join or visit for a day. We could not work exclusively with a group as Reggio Emilia seems to do consistently (Edwards et. al, 2012). Some days the explorations were productive with a lot of engagement; other times, we had to halt the work and follow the children’s desire to play with their new found friends in the group. It is my understanding that Reggio Emilia is more intentional in bringing children back to an experience than we are. Here it could be said that we are being child-centered, which indeed has much hold in our practice.

As much as I appreciate Reggio Emilia pedagogy, I contend that the process of decision-making or the setbacks of an investigation are acknowledged but rarely disclosed. Reggio pedagogy acknowledges that to listen and to interpret children's meaning is a challenging task (Rinaldi, 2006) and that project work is not linear, being full of "advances, standstills and retreats" (Rinaldi, 2010, p.132). Because illustrations about this process are rarely conveyed, one gets the impression that the walk in constructing curriculum is but a stroll. This fact drove this very study.

A "Reggio inspired" label sets a certain expectation of mimicking Reggio Emilia. I find that the terminology, "Inquiry through the Arts and Sciences," adopted by the American Opal School of Portland better conveys the process (<http://www.portlandcm.org>). To this term, I would add the word collaborative, to pinpoint the social nature of the work. I think our project could be defined as Collaborative Inquiry through the Arts and Sciences.

4.11. Rounding Up: Weaving Approaches

Although the revisiting sessions provided a memory of the process and invited theory making, I have to confess that I asked too many questions, and at times with the expectation of having children show understanding of the facts, such as the micro-organisms cleaning the sewage water. This shows that scaffolding is not an easy task, as it challenges the teacher to make decisions in the moment.

There were some elements of direct teaching, when for example, the technician showed and explained the bio-reactor tank to the children. Interestingly, here I accepted explication, as long it was not done by me! This is one of the tensions lived in this process. In the context of our work these decisions fueled other steps, and as minimum as it was, there was some explication, albeit with much intentionality on my part. Here I was enacting the paradox of teaching without teaching that I interrogate in this study, hiding behind the shadows of a third party explicator! The decision behind this information giving yielded much creative inquiry about the lives of the micro-organisms in the tank. However, I do acknowledge that, in this portion of project, I was teaching without appearing to do so.

Project work seems to mirror Grieshaber's stance about weaving approaches:

[G]ood teaching weaves together spontaneous pedagogical judgements, drawings on what is needed at the right point in time to move along conceptual knowledge, and skill levels within lessons and across units of work, projects, and rich tasks in intentional ways (Luke, 2005). It is this pedagogical weaving or shunting between levels of instruction that is indicative of highly skilled teachers and that draws on a unique combination of traditional, modern, and progressive pedagogical approaches (Grieshaber 2008, p.512).

Beyond the discourse of play based child centred curriculum, there are moments of direct teaching in Early Childhood education practice.

Malaguzzi does acknowledge that teachers can directly teach but privileges children's meaning making or theorizing over explication, adding that the decisions about direct teaching are to be a result of careful observation and interpretation of children's explorations (Edwards et. al, 2012). The conundrum to me is that there are very few examples in practice of instances when intentional direct teaching nurtured an exploration, causing educators to refute it. In the metaphor of making the path by walking, here the teacher's role is that of providing power bars to feed the walkers to walk a little further.

Teachers subscribing to child-centered practice would dismiss this step, for the experience of listening to a presentation would interfere with the learning on their own. I am not condoning direct teaching as pedagogy in Early Childhood Education. My argument is that within project work with children there are moments when direct teaching can (and perhaps should) occur, but only if is done in a way that will prompt inquiry. It is a means to an end. Within the model of high teacher control/high children's freedom that circumvents child-centred practice (Tzuo, 2007), here the teacher applies control (giving information) to prompt further inquiry, or the freedom to make meaning about the bio-reactor.

With judgement, there can be a place for fact sharing in long term investigations with children. The nub of this issue is pondering about the need, timing and effects of the decision on the project, or the judgement making about content, process and relationships (Biesta, 2012). Teaching in this context of project work connotes moments of teaching as giving information, but also as making judgements about this very mode of teaching.

4.12. The Indefatigable Path Maker: A Pedagogy of Passion

C. and A. are having a snack. When I greet them A. asks if there is project today. I remind her that we ended the project by sharing our learning at the performance. C then retorts, "Can we do another one"? "But you will be leaving soon for kindergarten. There isn't time", I reply. A responds, "We can have a short one for two days".

Margaret tells me that as she walks by the school that some of the children in the bio-reactor group now attend, M. tells her that there were no projects in Kindergarten.

As indicated in the reflection excerpt, project work was meaningful to the children. This would not have ensued without the teacher's passion and investment in the investigation. Grieshaber (2008) points out that child-centered practice confounds the role of the teacher. Project work uncovers this "hidden" role, as its very existence presupposes a "pertinent expectation", as described below:

In trying to make a good project, one has to have above all, a pertinent expectation, shaped in advance, an expectation also felt by the children. The expectation helps the adults in terms of their attentiveness, choices, methods of intervention, and what they do concerning the relationships amongst the participants (Edwards et. al, 2012).

One of the ways this expectation was conveyed was through calling the children the "bio-reactor group" and also by often re-iterating that we were doing research. When arriving at the centre for our weekly sessions, I would indicate that it was project time, and convene the children to gather the other researchers from the adjacent classroom. The children helped to carry the equipment (computer, lap top, paper and easels), and set-up the materials representing the bio-reactor mechanism. The intention was to set a

tone of research and cooperation with the children and to make visible our interest in listening to their perspective.

Continuing the discussion on setting expectations, I could have given up the investigation upon encountering a few roadblocks, such as lack of dialogue amongst the children, restlessness when we met and the disruption of formal perspectives gathering from the educators. However, I am glad to have persisted based on the value that we attributed to this experience for the children: working in groups outside their choice of playmate, invitations to theorize, reflection and engagement in the process of constructing understanding with others. Every time we came to a standstill and offered a studied provocation, for the most part the children responded positively. Consider, for instance, when bio-reactor pretence became repetitive. Instead of concluding the investigation then, we persisted a little longer with the idea of drama, as it had become a preferred form of representation. We decided to add props mimicking the tank and this powered further dramatization. Without this motivation to really challenge the children and the desire to walk a little further, the rich collaboration amongst the children and the meaningful piece that brought it all together, "poo theatre", would not have unfolded. The passion for inquiry furthered this work. In the metaphor of the ball toss game presented in the literature review (Edwards, 2012), in these instances I endeavored to keep the ball up in the air. This, I contend, was driven by passion, a discussion that I now turn to through Zymbylas' (2007) entreaty on passion as madness, which is conveyed in this passage from Alice in Wonderland.

But I don't want to go among mad people," Alice remarked.
"Oh, you can't help that," said the Cat: "we're all mad here. I'm mad.
You're mad."
"How do you know I'm mad"? Asked Alice.
"You must be," said the Cat, "or you wouldn't have come here."

(Carroll, 1865)

I contend that madness propels the educator engaging with the co-construction of curriculum with children. Informed by Foucault's writings about the politics of passion embedded in madness, Zembylas (2007) helped me understand the ways passion drives teacher's commitment to long term investigations with children.

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Zembylas engages with Foucault's conception of madness, saying that:

[B]eginning with passion, madness is still only an intense movement in the rational unity of soul and body; this is the level of unreason; but this intense movement quickly escapes the reason of the mechanism and becomes, in its violences [...] an irrational movement; and it is then that, escaping truth and its constraints, the Unreal appears (Zembylas, 2007, p.138).

The construction of long term inquiry with children can only be possible when teachers surrender to passion, and allow what is seen as “unreason” to unfold. I situate the “unreason” as the challenges that this approach presupposes. Unless you are “mad”, why would you engage with something so complex? A process that requires hours of observation and documentation, that calls for interpretation, uncertainty and vulnerability. You take one step at time and two back steps, as the negotiations with children may take you in a different direction. Many educators would claim that this is irrational, for teachers should know from the start what to teach. It would be easier to adhere to the truths that govern our practices, to subscribe to play without interference from the teacher, to prepare the environment and take a back seat allowing children to explore it. A few times I was able to escape the holds of child-centered practice in, for example, planning a visit to the bio-reactor to nurture the investigation, invite theory about a control panel or revisiting to sustain engagement. These practices made space for the “unreal” to take form. The unreal became the deep thinking through pretence about the micro-organisms.

Through a Foucauldian lens, Zembylas (2007) contends that, “Passion is an art of being and living outside of fixed identities that normalize the self” (p.140). This study about the role of the teacher in long term investigations did point in this direction. As I struggled with the children's inattentiveness, the course of action to take, and the constraints of practice and space at the centre, I lived outside the parameters of being an effective educator. This is enabling and constraining. It enabled because I had to invent a way to teach according to the demands of each situation, which re-defined ways of being an educator. It constrained because this creates much tension. It is not easy to not know what and when to teach, and for that I at times felt “stuck”. The reflections in Appendix D depict these moments of indecision.

I agree with Zembylas (2007) that passion is to be explored in education beyond the concept of motivation, but as the propeller of subversion. I contend that the act of undertaking long term explorations with children can be framed as subversion, in the sense that it dispels notions that play is the only curriculum for early childhood education. Our project did involve play, especially through drama, but it transgressed play through focused exploration such as drawing theory, representing with clay and guided dramatization.

Through the researcher's act of madness we transgressed boundaries of everyday play curriculum as understood through the lens of constructivism and child-centered practice. We formed a group of children coming from different classes to invite relation outside playmate preference. As well, we predict that the opportunity to theorize and co-construct meanings emphasized to the children and their strong disposition of creative inquiring. Long term investigations are the result of the work of passionate teachers. Schools then become places of teaching (Biesta, 2010, p.39). I now situate this study within Biesta's discussion on the aims of education.

In line with Grieshaber's (2008) criticism of constructivism, Biesta (2012) contends that the language of learning as informed by constructivism negates the role of the educator. He adds that "the point of education is never that they [the students] learn, but that they learn something, for particular purposes and that they learn it from someone" (p. 38). He adds that "learning" infers an individualistic undertone, thus making teacher's choices "invisible and inaccessible". Biesta (2012) adds that:

The teleological character of education thus suggest quite a different position for the teacher, not as the one who is there to facilitate learning or to implement directives formulated elsewhere, but as the one who plays a central role in engaging with the question about what is educationally desirable in each concrete situation, both to regards to the aim and the 'means' of education (and 'means' here needs to be understood in the broad, non-instrumental sense, that is, as the way in which education proceeds in terms of its contents, its processes, and relationships. This is a matter of *judgement*, not a *matter of execution of directives from elsewhere* (Biesta, 2012, p. 39).

Our process of decision making attempted to engage with these aims for education. The illustration below conveys the centrality of the teacher's role situated within the aims for education:

Contents – an open-ended investigation about the bio-reactor, living the value of sustainability and creative and collaborative inquiry.

Processes – co-inquiring through the languages of art and science with children generating theories and asking questions.

Relationships – cooperative group work, dialogue and exchange

Within these categories, this project was the result of continuous judgement making, and in sharing the process I wish to dispel the myth that Early Childhood Educators do not teach! They do so in complex and unpredictable ways. Child care centres that grow responsive curriculum with children take many risks; however only then do schools become places of teaching; of mad teaching.

Chapter 5.

Conclusion. Arrival: Looking Back. Looking Ahead

This study set out to investigate the role of the teacher doing project work in an Early Childhood Education context. The main findings attest to a strong role in initiating and sustaining open-ended project work. This role is informed through the practices of revisiting work with children, developing structures that sustain inquiry and in the challenges of applying responsive experiences through different medium. Whereas I sought to contest constructivism as inhibiting the teacher's more direct participation in children's learning (beyond watching play), I came to realize that constructivism does influence my practice, as I struggled with moments of more direct teaching, such as having the technician show and describe the control panel and the tank. I came to terms with this conundrum in the sense that the direct teaching was intentional to further the inquiry. I did not act as a "master explicator" (Biesta, 2010). The decision to open the tank and learn about the micro-organisms prompted interesting and varied conceptualizations of these beings. In this sense, I was enacting the role of "the emancipator school master "demand[ing] speech, that is to say, the manifestation of an intelligence that wasn't aware of itself or that had given up" (p.549). Having seen that through guided visualization as a form of revisiting the children conveyed curiosity about the micro-organisms, I invited them to theorize about these beings, or I prompted the children to apply their strong competence to make meaning creatively.

This study was trying to find out where the children were taking me but also where I wanted to go. Pausing the investigation to reflect was another tension, for teachers in traditional roles are supposed to know their territory. I conclude this discussion re-iterating the findings about structures that facilitate project work, the language centric nature of teaching, the role of passion in the value of revisiting, to which I now turn.

5.1. The Lay of the Land: The Practice of Revisiting

Another way to exercise a more direct role in teaching was through the revisiting sessions. Informed by Reggio Emilia pedagogy, we deliberately prepared gatherings with the children using images and text of their theories in order to emphasize the inquiry, to provide a memory of previous work, to detect possible directions and to bring back past theories and maybe questions to deepen the thinking.

I contend that this practice ought to be explored further in the field, as I learned that it was vital in sustaining the investigation. We had challenges, as this was a new practice to the centre and, despite several exercises in turn taking and dialogue with the children, it was difficult for them to attune to each other's conversations. Later we tried revisiting with two children at a time, as the group dynamics were not conducive to dialogue. In order to pursue long term investigations with children it is paramount that teachers adopt the practice of revisiting work.

What I came to realize is that revisiting is integral to the process of long term investigations, and I claim that it kept our investigation alive, delineating its importance to the children and conveying and highlighting our commitment to listen to their perspectives through the images, their theory sharing and the questions that we asked related to their experiences. I suggest that educators pursuing co-inquiry with children through projects build in structures such as revisiting to draw memory, to model the practice of inquiry in pausing, reviewing and reflecting. More research about revisiting work with children is needed in the field of ECE. Revisiting is a deliberate practice to generate and deepen inquiry; therefore, I situate revisiting as teaching.

5.2. Walking Poles: Structures that Support Long Term Inquiry

Another tension ubiquitous in our trajectory pertained to the general practices at the centre and in ECE context in general that could spark and sustain long term investigations with children. The one we struggled with pertained to the framework of dialogue at the centre, which was in its initial steps. The co-researcher and I debriefed

the explorations soon after its implementation, and then after deliberating for a few days, decided on the next course of action. This collaboration enabled and sustained this investigation, as we had each other to lean on when the terrain became too treacherous.

What I discovered through this process is that many structures need to be in place for growing long term investigations. The findings of this research suggest that child care centres need to strengthen the practices of dialoguing about curriculum in order to work responsively. A way that this could be done is by informally discussing day to day preparations about the environment in response to the unfolding of each day, the values of the centre, and the skills that build representation through the arts, relationship and inquiry. Furthermore, the research findings point to the need for allocated spaces with minimal distractions to carry out group meetings with children.

Teachers need to invite children to discuss topics, share points of view, theorize, listen and take turns speaking. In our context, the challenges that the children had focusing and engaging with each other's perspective points to this much needed dialogical practice with children.

Another issue pertaining to structures that this study uncovered is attention to the arts curriculum in ECE programs. If we agree with Reggio Emilia pedagogy that there is more to thinking than expression of oral language, then we need to learn how to speak through various art forms. Because the place of research was working on defining its practices when the research took place, the exploration of the arts as a form of inquiry was a new practice. The children had challenges representing through clay. Instead of representing the micro-organisms as proposed by the teacher, the children chose instead to play with clay. The strongest representations came from drawing, with the children depicting the imagined micro-organisms forms, the underground layout and the functioning of the bio-reactor tank. It was incredible to see the children's competence with the powerful language of drawing. They focused, persisted and represented in detail. Drawing was a medium that they were used to at the centre and as a result they could use it to communicate fluently.

I also came to understand the power of drama to construct and represent understanding. The children in our group were quite energetic and drama afforded them

a form of expression that captures the desire to move and play. I invite early childhood educators to consider drama as a way of making meaning to add to the also rich self-initiated fantasy play that is curriculum in early childhood education.

5.3. Walking and Talking

This research informed my privileging of the oral languages over the graphic and performing forms of expression. I do see the power of the children's drawings, their posing and enacting the micro-organisms, yet in our revisiting session I provoked them to articulate through words their theories about their looks and behaviour. There were times when that is what the children did. I was not satisfied with their constructions until they actually started articulating in words how the animals looked and moved. In retrospect, we could have asked the children to draw the "animals" one more time and use colour and details about their body, extrapolating from their initial conceptions represented with sharpies. I laud M. for his initiative in showing us, rather than describing his conception of the "micro-organisms" orally. He taught me that not everything can or should be expressed in words. I invite educators to legitimize the non-verbal ways of communicating!

The reason behind this conundrum may be that in situating speech as the utmost form of meaning making (Vygotsky, 1973), the socio-constructivist teacher may not be convinced about the children's actual meaning making until it is expressed orally.

5.4. Zigzag Teaching: Weaving Different Approaches

The tension of exercising a more direct role in co-constructing this project with children permeated this work. There were boulders on the path!

I struggled with exercising the intellectual dialogue proposed by Reggio Emilia Practice. For instance, the decision to have the technician open and present the control panel and the bio-reactor tank created moments of direct teaching, not learning by playing, as informed by constructivism. In the context of our work these decisions fueled

other steps, and as minimal as it was, there was some explication. What I discovered is that information giving can be part of the process, and that it can be fruitful if done intentionally, promoting further inquiry. Here I hope to be engaging with Grieshaber's invitation to exercise "active interruption of stereotypical performances of practitioners in relation to children in ECE" (p.515). Beyond the discourse of play based child centred curriculum, within project work there are moments of direct teaching in Early Childhood education practice. We extrapolated from play curriculum to engage in a focused yet open-ended exploration.

Malaguzzi does acknowledge that teachers can directly teach but he privileges children's meaning making or theorizing over explication, adding that the decisions about direct teaching are to be a result of careful observation and interpretation of children's explorations (Edwards et. al, 2012). This is what we attempted to do in this study to address a gap in the literature of teaching in the early years.

There is no doubt that in the context of project work, the ECE teacher teaches, and, in our case, this meant proposing a topic of study, observing children's work and designing experiences to respond and provoke, As well, I taught children when I asked the technician to show electronic and mechanical structures and share information to nurture the investigation. Further to this, teaching meant repeating experiences, and conveying an expectation about the value of the work in order to invite and sustain inquiry. Here I was exercising judgement, which Biesta (2012) discusses below:

....[T]he teacher nonetheless plays a crucial role because at the end of the day judgment about what is educationally desirable can only be made in response to the concrete and always unique situations that emerge from encounter between teachers and their students (p.40).

I contend that negotiated project work is a conduit for judgement making, as it propels teachers to listen to the unpredictable ways that children make meaning through collaboration with children and other teachers. Because it relies on interpretation there will be "always unique" opportunities to deliberate. There will be different children who will bring unique understandings; as well the topics of investigation will vary and so will the perspectives given by other teachers.

This attempt to listen is driven by passion, meaning “to suffer” both in Latin and Greek (Zymbylas, 2007). As I understand it, suffering can be equated to the uncertainty that negotiated project work entails. The teacher as all-knowing is replaced by the image of the teacher that is all-seeking. She seeks to provoke collaborative meaning making, and to listen to the children, to the contexts and to her values for education. In this line, Zembylas (2007) elucidates Foucault’s connection between passion and madness, proposing that “madness is [...] implicit in the very phenomenon of passion” in that the passionate “subject would surrender to unreason” (p.137). In the sense that project work entails much complexity in documenting, interpreting, listening and responding, in comparison to traditional ways of teaching (explicating) and the constructivist pedagogy (children learning by themselves through exploration), the teacher’s work engaging with inquiry based, open ended and negotiated project could be said to be “unreasonable”. Within the metaphor of walking to make the path, the “listening” teacher could be equated with the backpacker who has a general idea of places to explore, who studies the possibilities of places to go, consults with fellow travellers and marvels at adventure and change. As a backpacker some “suffering” is on the horizon, for she won’t know for sure where she will sleep or eat from a day to the next. The constructivist teacher would be travelling on a guided tour, for she believes that facilitation is the effective way to travel. Finally, the explicating teacher would be the cruiser, who planned it all ahead, knowing well where and how she wants to go.

Educators growing projects with young children teaches, and this is done by exercising judgement about how to deepen the inquiry, which sometimes does include information giving and making informed choices about how to respond to the children’s ideas or how to provoke new ones. Without a passionate disposition to undertake this work, long term investigations with children are not possible, for this kind of work indeed entails vulnerability, doubt and uncertainty (Rinaldi, 2006).

5.5. Limitations and Areas for Further Research

This study has a number of limitations. I was not a full time teacher at the centre and thus not counted into the teacher/child ratio. Further, I was less involved with the teaching team and this affected my communication with the teachers and the inquiry. This work can be interpreted as only being possible with extra teaching staff. On the contrary, being with children more often would only have further enriched this study, as more meetings and casual inquiry could have taken place. We could have also checked in with the children more often about their thoughts, not having to wait an entire week before meeting.

The co-researcher and I aimed at working alongside the teachers in pursuing long term inquiry. We were assigned a different teacher who would document and support the implementation of the experience every week and report it to the team. After the session, the teacher(s) met with us to debrief. This took place until half way through the project, at which point there were staff changes and the meetings ended. The inquiry circles that hosted perspective sharing for the project had to address other pedagogical matters during the last portion of this research. Teacher perspectives became more informal at this point. We were too far along to change the plans of having one consistent educator collaborate in this project. Ideally beyond the collaboration between the co-researcher and me, we would have one educator walk with us throughout. Better still, now that I have developed further insights about this work, I could work as a mentor to a teacher wishing to pursue project work.

The most profound limitation pertains to the absence of perspectives from parents. Although informal check-ins with parents was part of the process, we did not hold meetings or send notes soliciting perspective. Collaboration with parents to discuss curriculum is one of the areas that the center is hoping to strengthen. The parents were aware of the project and did attend the micro-organism performance where the children shared their learning.

Another limitation of this study is the absence of a more thorough discussion of the value of documentation and interpretation in ECE practice. Contextually, the study could have addressed the power of composing pedagogical narrations, or stories about

children's explorations and teacher's reflections. Appendix A shows the documentation process and some pedagogical narrations. Yet, the affordances of this Reggio informed practice was not addressed in this study.

Given the limitations, my suggestions for further research would be:

- implementation of a long term investigation co-constructing meanings with parents through consistent perspective sharing sessions
- the enhancement of art programs in fomenting thinking through the arts
- studying the practices of revisiting work with children
- furthering the relational aspect of project work in building communities of research with children and teachers
- questioning the supremacy of the oral language as the most prominent vehicle of inquiry
- exploring the impact of passion in the role of the early childhood educator

“Wanderer there is no path. The path is made by walking.”

(Machado, 1912).

Just as in the exposed roots, rocks and branches that make us stumble in our walk; these “bumps” are the road. There is no other way.

This study barely scratches the surface of a very complex topic about what it means to teach within the paradigm of project work. It was a long trajectory from M.I.'s interest in the panel to the embodiment and performance of the “animals that eat poo”. What I discovered is that passion drives the teachers to lead the way, in overcoming the stumbles. The crux of this matter is to find ways to lead without sidestepping the children, who have such a great disposition to go on quests for inquiry. This conversation attests to this.

- C.: "I think that they [the microorganisms] are as small as bacteria. If you eat candy, it goes into your teeth and you have to go to the dentist. It eats sugar. It makes holes in your teeth cause it tries to find the sugar."
- Elaine: "So the animals look like bacteria?"
- C.: "Well, there are some nice bacteria. They like the toothpaste and that kills bacteria. There are no nice germs; there are only mean germs."
- Elaine: "Do you think the animals in the tank do good things for us or are they bad?"
- C: "They eat poo. They don't have to waste."

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Appendix A.

Strategies: “Advances, Standstills and Retreats”

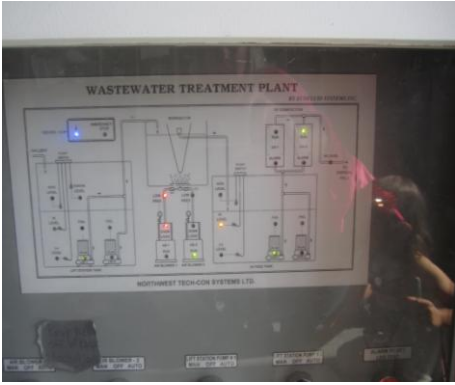


Here I outline our investigative process. My belief is that the sharing of the complexities inherent in the process of a long term investigation with children would benefit educators in implementing this work. I wonder if it is this missed understanding about process what inhibits this type of work in child care centers, or over-simplifies project investigation. It is my view that one of the greatest contributions of Reggio Emilia regarding project work is this notion of complexity and uncertainty inherent in the process, where both children and children become co-learners.


I borrow from Rinaldi (2006) the term strategy to name the choices in the process. Rinaldi (2006) posits that:




Strategy, like a plan, means predicting and implementing a sequence of coordinated operations. But differently from planning, strategy is not based exclusively on the initial hypotheses, so that the subsequent decisions and choices are based in the relation of the development of the work and of the objectives themselves. Strategies are constructed and deconstructed. Strategies benefit from adversity, chance and error. Strategy benefits from taking action into the realm of uncertainty, on the part of both protagonists in the process – adults and children – and requires listening, flexibility and curiosity. Strategy is characteristic of the way children proceed, as well as of any authentic act of knowledge building and creativity (p. 132).



Below is the sharing of our strategies highlighting the complexity of our attempt to consider our values, intentions, children’s voices, theories, predictions, connections, questions and the barriers encountered along the way.

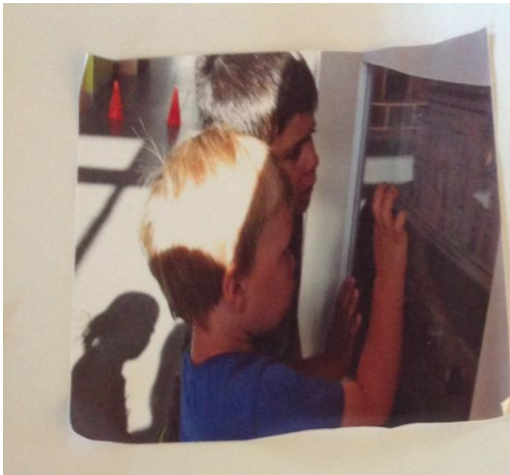
Prior to investigating the bio-reactor, the children had been exploring the building through by touching, listening, rubbing and photographing. I believe that this state of heightened attention to the surroundings invited M.L. to share his interest in the bio-reactor panel, which became the genesis of this investigation.



Intentions	Strategies	Happenings
<p>M.L. asks Teacher A. about the panel in the north cubbie area. K. the administrator, tells me about M. L's question (she too was participating in the focused looking of the building)</p> 	<p>We follow-up on the information and invite M.L to the cubbie area to look at the bio-reactor panel. The next time I come, M.L shows me the drawing. I asked him to share them with a few children at group time. He prefers that I do it, and so we followed-up. We then all went to the panel to observe and draw it.</p>  <p>The North side children were invited to visit the panel and wonder. I ask them to draw it after.</p>	<p>First the children have time to look at it closely. We then asked them to draw it as a way to play close attention. Question asked: "What do you notice?" The drawings depict the many lights.</p> 
<p>Reflection</p> <p>I think that the invitation to notice the building was at play here both by the teachers and the children. I do not have documentation of M.L. rubbing or sensing the building. But could it be that by watching other children explore the building and the visiting the display of the rubbings in the classroom heightened M.L's awareness about his surroundings? K. (the administrator), told me about M.L's question and had also encouraged the teacher to follow-up with the child. We followed-up as this could open up an interesting investigation on the environmental aspect of the building, which was in line with the sustainability vision. We were looking for a focus and M.L's wondering about the panel seemed very opportune. Who would think that an electronic panel would be of interest to the children? Had they noticed it before when they use the cubbie area? We need to see if the panel continues to capture the imagination of the other children. We should bring them to the panel again to test the waters.</p>		



Intentions	Strategies	Happenings
<p>We are curious about the children's meaning making and decide to repeat the visit to the panel. I assume that because the children are quite energetic and group focused inquiry is a novelty at the centre; the children have challenges at this point engaging in discussions. Drawing seems to work, as the children concentrate. Drawing to notice is a way to continue the conversation between the children and the panel.</p>	<p>Children are invited to draw the panel. Sharpies, clip boards.</p> <p>We do not have yet a group formed; rather the participation is random based on what the teachers determined and availability of the children at the time.</p> 	<p>Drawing depicts many lights and buttons.</p>
<p>Reflections</p>		
<p>At this point I am uncertain about what comes next. I need to make sure that there is interest in the system. The children see the technician work on the panel, but I haven't asked any questions about what it is; neither have I asked them. I am curious about the panel becoming a point of entry to studying the bio-reactor. It intrigues M.L. I need to make sure that this would be a rich topic to pursue. At the meeting with the teachers after the experience, this unfolding is shared. Teacher D. mentions that some of the first children enrolled at the centre experienced the closing of the building due toilet flooding caused by the disposal in of cloth towels in the toilet. She inferred that the children had some knowledge about the panel.</p>		

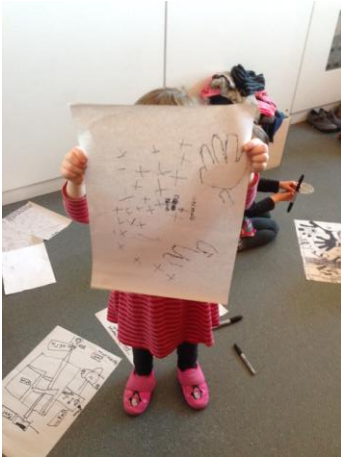

Intentions	Strategies	Happenings
<p>A decision is made in the moment to have the technician that was working on the panel the day I met the children to present the panel.</p> 	<p>Children listened attentively. The description about its functioning was given and the panel is opened. They are invited to draw the panel to further observe and “digest the presentation”.</p> 	<p><i>The drawings depict a variety of lines, buttons and lights. There was a lot of focus on this activity, as the children took the invitation seriously.</i></p> 
<p>Reflection</p>		
<p>Our choice to use clipboards and sharpies seemed to have conveyed an attitude of research, as they were using authentic materials. M.L. supported M.I. with her drawing. We displayed the drawings on the floor for the children to look at. There as not much response, but the children did visit each other’s drawings. Hopefully, the drawings conveyed to the children how seriously we took their work, communicating as well, an attitude of research about the bio-reactor panel. Drawing, more than speaking is a powerful language of expression for this group. I continue to be mesmerized by the attention to a topic uncommon for this age group. M.L. sometimes has challenges relating to his peers, but in this context he was helpful and caring. I am fascinated by the spirit of cooperation that small group work can engender. We need to revisit this work next week to see if the children can discuss their insights and inform us about their curiosity. It is powerful to observe the children’s disposition for research. Here we witness a strong image of the child and their strong quest to make meaning of their surroundings.</p> <p>We are having more of a consistent group emerging, but many children from the north side attended. M.I., Z., M.L. were the children that previously participated in other experiences.</p>		

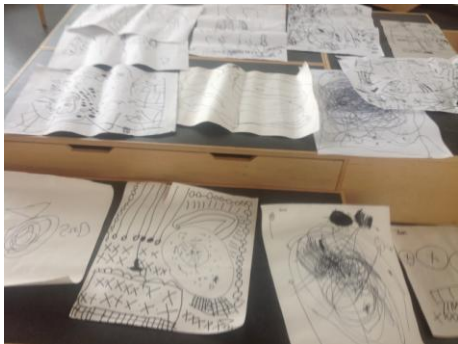
Intentions	Strategies	Happenings
<p>Revisiting to connect with the topic; visit each other's drawings and emphasize the context of research</p> 	<p>First we show pictures of previous work and then display their drawings on the floor for revisiting.</p> 	<p>Challenges again with focus. Children are fidgety, and do not engage in discussion. We start singing at the beginning of our meetings to create some rituals and start developing group connection and to hopefully help children focus. For a brief time, they looked at the drawings, but there were no conversations, despite our invitation to the children to discuss each other's drawing. This type of work is new to them.</p>
Reflection		
<p>Small group dialogical activities are one of the structures that sustain long term inquiry. This was a big challenge for us in many of the meetings. We changed the timing, making it shorter, met at different places, and used games to practice turn taking.</p> <p>These initial drawings were displayed by the panel to provide a memory to the children but also to invite the curiosity of others. They were torn by the children. We discussed the possibility of stewardship in caring for the building as a focus to keep in mind. There were many lights and of different colours. Should we invite the children to wonder about its meanings? Is there any pedagogical value in studying the lights of the panel? Would this create stewardship in reading the panel to predict its health? I was excited about the possibility of having found a focus. Yet, I wondered if this was too much my agenda, or if indeed we should harness this emerging interest in the panel.</p>		




Intentions	Strategies	Happenings
<p>Peer scaffolding. Honoring teacher D.'s suggestion that we could engage a peer that has knowledge about the toilet system and panel to nurture the investigation.</p>	<p>Teacher D. meets G. at the washrooms and asks him to explain to the children what he learned about the toilet flooding.</p> <p>She documents the process with text and images.</p> 	<p>G. explains his understanding of the system to the children and puts a sign by the toilets warning that cloth towels were not to be thrown on the toilet. . A pedagogical narration is written by Teacher D. and it is displayed by the panel alongside the children's drawings (these drawings were ripped from the wall by some children). G. goes to the panel with some children and explains his understanding of the recycling system. I am thinking at this point that stewardship of the building could be a broader topic to be considered. This is the text from Teacher D's documentation.</p> <p><i>G. lifts his hand to pretend to move the dial from behind the glass in a turning motion informing me: "this is the blue one" looking up to connect the dial to the blue dot he sees in the top left hand corner of the diagram. M.I. places her finger on the glass, turns it just as G. did "this is where the poo comes from." G. wipes the glass with his whole pal around the area of the blue dot on the picture repeating what M.I. said. "This is um where the poop does not come up" M.I. responds to him by pointing to another red dot in the middle of the diagram. "No, this is where it comes out here and the pee too". She continues, "but the water comes back", pointing to the box underneath the dot. "The water comes in the toilet."</i></p>
<p>Reflection</p>		
<p>This may be considered as leading the children. The decision fit with the value of having students apply their learning to concrete situations and also to model a process of inquiry, where consulting with others is a reality. I was amazed at how much G. knew and the connection that was made between the toilet and the panel. It was a way for him to contribute his knowledge before leaving for Kindergarten. I value the discussion that he had with M.I., who knew about the recycling system! This process models to the children that their peers are knowledgeable and could become a resource in their learning.</p>		

Intentions	Strategies	Happenings
<p>Another visit to the panel to look at the pedagogical narration where G. explains the connection between the toilets and the panel. The children will also look at their previous drawings.</p> 	<p>Group to look together at PN and share their knowledge and wonderings</p> <p>A group is being formed as per the teacher's suggestions. The children had been to at least one previous exploration.</p> <p>Children from both South and North rooms North room: M.I, M.L. (J. and S.) South: C., M. and B.</p> <p>The Bio-reactor group is formed, mostly based on the children's ages (leaving for Kindergarten) and time being at the centre. Later A. and S. voluntarily join the group.</p> 	<p>Some of the children were not present this day. They listen to my reading of G's explanation in the PN and look at the drawings. When revisiting the tank, this is what they said:</p> <p>"Some lights are off and some are on." C. Four lights on and night lights off. Maybe R. turns on some lights when he comes here." M. "Maybe yellow means go"? C. "Maybe these lights control traffic lights." M.</p> <p>M. has a-ha moment. "I know, I know.", and sets up to explain the process. He too had experience the flooding of the toilets and knew about the tank.</p> <p>While tracing the panel, M. explains: "Toilet, flash, turn, turn, turn. The new water comes and comes out. Down, down, [makes sound vroom and traces the V representing the tank]. Comes down, comes down here. It goes ... flasshhhhhhhhhh and it comes here again."</p> <p>"Why are these lights on?" Elaine "It comes upstairs, playground; tank that is upstairs at playground. There is a black tank upstairs. Let's see it." M.</p>

Reflection		
<p>I was curious to see if they would further interpret the lights and connect with the functioning of the tank. Would they start monitoring it to care for the building in line with our values? However, M. took us somewhere else. It is unfortunate that M.I. was not present that day, as she had been part of this investigation from the start and also participated in the discussion with G. She had a lot of knowledge and demonstrated interest in this investigation. I can see that my question about the meaning of the lights did not work, as M. observations had more to do with process. A great moment of reciprocity. I too think about going to the tank but M. invites us before I can articulate the idea: a meeting of minds! I felt like a true collaborator here. M. and M.I. seem to know more about the system than I do, and I value that this exploration opened space for children to inquire, to see themselves as the scientists that they are. Mostly, they must feel very important in our eyes, in being recognized as the competent people. Who would think that a panel with a glass on the wall would provoke so much interest? The children were genuinely curious and felt validated by our actions to harness this curiosity and in provoking them to think further. The context of research is consolidated during this experience. Reciprocal empowering was in action. I feel passionate about the project; the children witness this passion and act. Their passion furthers fuel my own. I felt so embodied during this moment of connections: to the panel, to the tank and to the children.</p>		
Intentions	Strategies	Happenings
<p>Following M.'s prompt, we visit the outdoor bio-reactor tank.</p> 	<p>Listening with the whole body.</p> <p>We explore the tank on its very top. The children are encouraged to lay on it, listen, touch, smell.</p> 	<p>Children's comments:</p> <p><i>"It smells bad. It smells like poo and pee. They fix poo and pee here."</i> M.</p> <p><i>"It makes sounds."</i> Elaine</p> <p><i>"Poo, pee, dirty water."</i> C.</p> <p><i>"Very loud. A different noise."</i> Z.</p> <p><i>"A different accident, a different sound."</i> M.</p> <p><i>"It sounds like water."</i> Z.</p> <p><i>"It sounds like a stream."</i> C.</p> <p><i>It sounds like a water fountain."</i> M.</p> <p><i>"It sounds like a water fall."</i> Z.</p> <p><i>What is happening with the sound?</i> : E:</p> <p><i>"The poo and pee with the water."</i> M.</p> <p>S. and N. were in the playground and ask to smell the tank. They join us.</p> <p>A. asks to see the panel and I ask M.I. to chaperone her visit (video-recording). Due to her interest in this investigation A. becomes a group member. Appendix B portrays the conversation.</p>

Reflection		
<p>Through the PN, G. scaffolded M.'s thinking about the tank, as the too witnessed the flooding of the toilet. R., the technician is a presence at the centre, as he comes almost every week to monitor and clean the tank. I am glad that I followed M.'s prompt to visit the tank right away. This was an important aspect of this work: "to be with tank"; to listen attentively, to feel it, to smell it. There is more than an understanding and wondering about the tank unfolding; the bio-reactor is fomenting relationship building. Even though we seemed to have at this point a core group, due to her interest in our pursuits A. became part of the group. K. (the administrator) suggested that we show the video explaining the bio-reactor to the children. We have a conversation about the value of this. Would we be robbing wondering from the children? If we used this to nurture the investigation, would this be a good time? How powerful for M.I. to chaperone A. and have a discussion. This is a different kind of relation beyond the rich and more coming ways that children connect through humor, fantasy and play. Meaning making was afforded by a web of relationships and previous knowledge based on wondering and experience. The investigation is creating a context to apply what the children have been learning, that may not be obvious in their play. The tank has many interesting possibilities for further inquiry as it is the heart of the sewage water purifying system. Informed by M. and G. the children know that there is poo and pee inside the tank. We need to try to deepen their theory making.</p>		
Intentions	Strategies	Happenings
<p>Revisiting the visit to the tank with images and drawing on the tank.</p> 	<p>Revisiting session. We narrate the work from the previous week to revive the memory and elicit discussions</p> <p>At the tank the children visit it again, listening, touching, and smelling. We distribute big drawing boards, paper and sharpies. The proposition is to draw the inside of the tank. "What do you think it is happening there?"</p>  <p>Pictures of revisiting the tank pictures inside</p>	<p>I showed the images of previous work and read back to the children what they had said about the tank. The children were fidgety. It is a challenge to engage them in group conversation. I think that they are capable, but need to learn how to dialogue. At the tank, we explore it again through the senses, with the rest of the group that did not attend the previous visit to the tank. The children said the following:</p> <p>"It smells like fish." M.</p> <p>"It sounds like water. It does like poo and pee." C</p> <p>"It smells like chicken. Apple." M.I.</p> <p>"It smells like dirt." M.</p> <p>"Pear. I smell a bit of pear." A.</p> <p>"There is water coming up." A.</p> <p>The children are asked to draw what they think is happening inside.</p> <p>Drawings depict: A system of pipes, movement in the tank ,toilets connected to pipes and poo. The children drew on the tank.</p>


Reflection		
<p>A whole week elapsed. Had I been a teacher at the centre, I would have printed the images prior to our meeting and display them to elicit discussions. I had challenges circulating and connecting with each child, as they wanted to share their drawing with me. It was important to check in with each child, but this proved to be challenging, as some touching base required more time. The sensorial engagement with the tank to draw must have enriched their thinking. The video recording reveals very strong engagement in this experience. Drawing is a rich language to convey meaning with this group. The drawings conveyed: a system of pipes, bubbles, and movement. The drawings were sophisticated; the children had to envision what was below the tank. The previous work done exploring came together here. The children were connecting and making sense of the facts and wonderings. It was powerful to see their responses. Children envisioning complex plumbing systems. This extrapolated observational drawing and drawing from imagination, as here they were drawing for inquiry and a bio-reactor tank was not a typical topic to draw or inquire about. We have a project under way! Should we have invested more on setting expectations for revisiting? Or is this lack of engagement typical of project work but hardly disclosed? I believe that having 30 minutes of focused work with children everyday could support participation in project work. This is a practice that needs to be cultivated at centres, together with dialogical practices in order for project work to unfold. I think that we have a long way to go in setting expectations with children about time everyday for focused work a la Reggio. The predominant free play practice interferes with this. If, however, the children are competent, should we not invite more intentional teacher designed observational based work within a play and exploration based context? It is still play, but not free. The discourse of child-centered and non intervention in play complicate Reggio inspired project work.</p>		
Intentions	Strategies	Happenings
<p>We again visit the tank and revisit their drawings</p>	<p>Displaying the drawings on the floor</p> <p>Margaret suggested that the children share their drawings with a partner, as group conversations continue to be a challenge.</p> 	<p>Discussions at the centre: Should we show the video explaining the bio-reactor? The conversation between Marcus and H. was transcribed by Teacher V.</p> <p>“R’s house. Poo, pee, dirty water. Come from the bathroom, come from people in the bathroom.”</p> <p>“The water was clean; the poo and pee made it dirty.” M.</p> <p>“Where does it go?” – Teacher V.</p> <p>“It goes to the tank outside”: M.</p> <p>“What is the little drops?”H.</p> <p>“pee” : M.</p> <p>“What is this M.? H. says pointing to a line</p> <p>“Dirty water”: M.</p>


Reflection		
<p>Since group debriefing is a challenge, we should try to do this one-on-one. Since we are there only once a week, this complicates things. As the passage above shows, debriefing with two children work. As H. and M. discussed the drawing. The other children looked at it briefly, but did not say anything, despite the prompts. They seemed excited to explore the loft area, where we met, as this is a place rarely visited. Even though there was not a discussion about the drawings, it was an important experience to study what they had done before. The children know about the connections between the panel and then tank, and that the tank contains the poo, pee and water. The drawings show that the children see the tank as a machine (movement, noise, connections to pipes). K. the administrator proposed that we show the orientation video about the building to the children. I contented that whereas there are times when we use information to feed the investigation and the wondering, I found that there was too much information, and that at this point, we already had quite a few information provided by the children. I did not believe that showing the video would add to the wondering and meaning making. If there are opportunities to discovery, why tell?</p>		
Intentions	Strategies	Happenings
<p>The technician opens the tank and shares the water repurposing process.</p> <p>Fortuitously we see the technician outside working on the tank). We seize the moment and ask him to open the tank to show it to the children.</p> 	<p>The children observe the inside of the tank</p> 	<p>The children were attentive throughout the presentation. R. invited them to come close to observe the tank (movement, bubbles, hoses, taps, and pipes). What they had predicted about the functioning of the building in their drawings was part of what they saw!</p> <p>The children were invited to smell it</p> <p>We also invited the children to ask questions to Rudolf . A. asks him: “How you know this stuff?”</p> <p>The children learned about bacteria living in the tank.</p> 


Reflection

I did not expect that R. would present the tank functioning; My intention was that the children observed and asked questions. His explanation was beyond our control and although there was a lot of explanation, the children were very attentive. This is when the micro-organisms came to their attention, as Rudolf mentions their work and shows them the clean water. It was powerful to have the children experience learning from the community. The pipes depicted in the children's drawings already showed pipes and movement and that is what they saw! This is not a common topic to explore in preschool. The pursuit of the bio-reactor exploration heralds the image of competency in children, their curiosity, wonder and desire to make meaning. B. was there. Why did I not follow up in having he attend all the sessions of our investigation?



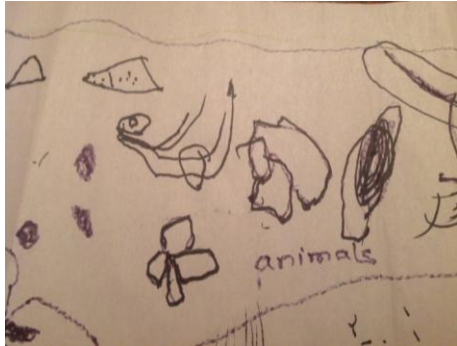
Ideally we would have viewed the video-recordings of our previous visits to the tank before our next response. I am not well versed in this and Margaret was learning how to use and download the new equipment. We did reflect afterwards at our meeting. We were excited about this unfolding. I mentioned the danger of the trap of constructivism to get the child from A to Z through discovery; when following the inspiration from Reggio we should be curious about the wishes and thoughts of the children. We are analyzing data but wonder if we should have been even more meticulous (time constraints, context of not being at the centre everyday). If I were a regular teacher at the centre, we would have had more time to conduct more detailed observation, revisiting and analysis.




Intentions	Strategies	Happenings
Revisiting the Tank.	Margaret shows the images of the visit to the tank 	Children's words: "R. was telling us something about the animals. They eat that poo stuff." A. "I asked R. how he knew that poo stuff." A. "That's the part when the animals eat. That's the clean water." C "You remember the poo and pee." A. "What did Rudolf say?" Margaret "The animals eat the poo and the pee?" M. "Yellow poo" M. "Bugs." Z.


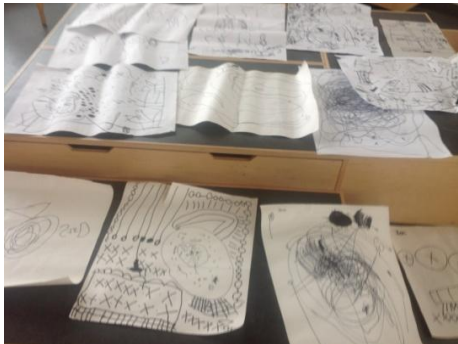

Reflection		
<p>The revisiting was fruitful. The micro-organisms enter the investigation! Although some of the children knew something about the recycling of the water (M.I. and M.), they were unaware about the bacteria doing this work. The preoccupation about R's telling vs. the children discovering here was dismissed, as this piece of information sparked curiosity. They remembered this at debriefing, as this obviously intrigued them. There are indeed moments when the teacher or someone within the community (a child, a parent, and a video) feeds the investigation. It is not all about discovering. Facts and wondering can go together as long as fact giving is studied, intentional, and does not overtake the children's wonderings. I think that here we lived Rancière's (2009) theory about the equality of intelligence. R. the bio-reactor technician became a teacher. He had so much passion about the topic and A. sensed his knowledge when she asked "How does he know all that stuff"? Z .appears distracted, in and out. Is she interested? Or is this her demeanor? Can she be engaged and at the same time distracted? As it is in life, we cannot engage 100% all the time. Yet I have this expectation of children. It is as if I fail when I cannot keep them involved. Besides the lights in the bio-reactor, we now have another possibility to focus our investigation: "the animals".</p>		
Intentions	Strategies	Happenings
Pictures of the tank in both classrooms	We wanted to foment conversations about the tank amongst the children, since some of them had seen R, the technician at work before, had been part of the showing of the panel.	We asked the teachers to keep them in the classroom for revisiting and taking notes. Teacher D. followed-up, but we did not receive any documentation.
Reflection		
<p>Why didn't we at this point ask the administration to work with teacher D.? She from all the teachers was the one that showed most interest. I think that many times it is the teacher, through her intentions who models an attitude of interest in the children. It is not leading, but it is a way to ignite passions. If she cares, the children get the message that this is important and may be inspired to join. I am a passionate teacher and sometimes wonder if my passion is manipulative. Do the children really care? Or do I care more and make them care?</p>		
Intentions	Strategies	Happenings
<p>Since clay is often explored with the children, we decided to use it to represent the tank by looking at photos of the tank and dig deeper about the meaning of the tank. We had used only drawing at this point and thought that a different medium might elicit further inquiry.</p> <p>Would the children represent the animals?</p>	<p>Teacher M. set up the table beautifully with the tank images displayed upright on the mirrors during free play</p> 	<p>I did not receive documentation from the teachers. The portion that I observed, A. and M. represented the tank briefly and moved on to play in a different area of the centre.</p>



Reflection		
<p>M. and A. set out to make coils to represent the tank and M. used a learned clay skill of bowl shaping to make the tank. A. started. She rolled a ball and called it the tank. Other children coming to the table started representing something else, and so did A. M. ended up representing the whole tank. It was simple but meaningful and he was obviously paying attention to the details and hopefully think with and about it. I asked teacher M. to continue this work. I am not sure why this was not offered again to the children as a group. The North side did it too, but I did not get any pictures or documentation.</p> <p>My conclusion was that although the children were familiar with clay, they did not seem to have had previous experiences with representing with a focused purpose, beyond creative expressions .I think that this was abandoned too soon. Why didn't I try to offer it again and again in a quieter environment, solely with the children with the bio-reactor group? I could have more intently worked with the children on this. Slow down. Let the children get familiar about thinking with clay. I am not sure if representing the tank with clay will offer much insight.</p>		
Intentions	Strategies	Happenings
<p>Since the children are very energetic in this group, and being curious about the language of drama to invite inquiry, I decided to offer drama in the format of guided visualization. The children had mentioned the animals in the debriefing session and I wondered if this could be something that interested them.</p> 	<p>Guided Imagery. We had a debriefing conversation before guided drama about the previous investigations, recapitulating what we knew so far. I made an improvised tank with chairs to represent the tank. I narrated a simple script using the previous information and discussions from previous meetings highlighting the panel, toilets, and especially the tank. This is what was narrated:</p> <p>“The tank is working. It is noisy. It smells. There are animals inside the tank They are cleaning the water. They eat poo.”</p>	<p>This was received very well by the children. We repeated the enacting more than once upon their request. They started moving in different way in the the tank, going under chairs, hiding. There was true enjoyment in being something else together. This we called “play theatre”, where there was a purpose set by the teacher to experience the tank, and yet there was room for improvisation within this proposal. The children started leaving the tank (being naughty by transgressing the boundaries of the tank). Information talk was used to describe their actions.</p> <p>We can see from the images an understanding that the microorganisms were laying down or kneeling, moving as if swimming. They moved fast. Was this an understanding that they were small?They did not jump and run. So perhaps their bodies were conveying the children’s interpretations: small, uniform.</p>

Reflection		
<p>We can see sympathy for the micro-organisms that the children call “the animals”. There was mutual enjoyment from teacher and children. The children were expressive, listened to the prompts, and yet creatively acted, by moving in different ways .It worried me that I was perhaps being too directive with the prompting Should I have invited the children to improvise before giving them prompts? Since my intention was to get children to revisit what they knew and perhaps extrapolate from that, I decided to start with something familiar with guided imagery of a “script” familiar to the children. This has been a constant struggle: how much to feed the exploration, and how much to let it naturally unfold. Not being at the centre makes it more challenging to keep the investigation alive. I could have tried the guided imagery a few times over the week, repeat and repeat, document and then plans with the teachers according to the responses .Ideas about bringing in props started to emerge. Teacher D. suggests creating a dramascap. I think that keeping it kinetic may be a way to go.</p>		
Intentions	Strategies	Happenings
<p>The children were playful and engaged. The language of drama prompts further meaning making</p>	<p>We repeat Guided imagery using previous actions</p> <p>Concentration (close your eyes. Enter your animal body).</p>	<p>Lots of transgression and playfulness. The animals continue to get out of the tank, to hide under the chairs, to lay down, to crawl, to slither, to sleep. The children have an understanding that the creatures do not have legs. This is very interesting as when we look at images of micro-organisms on the Internet, they are not unlike the children’s depictions. When they “eat” their membrane stretches, almost like the children’s exaggerated mouth movements when pretending to consume the waste.</p>
Reflection		
<p>We seemed to have found a focus: Within the vast possibilities for explorations within the bio-reactor topic it seems that the micro-organisms and the fact that they consume waste captivated the children. It is related to sustainability in understanding the value of these small beings cleaning the toilet waste for us. Sustainability is one of the topics in the Foundations of Our Intentions curriculum document developed at the centre. Fact and imagination coexist here. The children show so much pleasure in embodying these creatures. I can see the potential of drama as a legitimate language of inquiry which is often missing from child care curriculum.</p>		

Intentions	Strategies	Happenings
<p data-bbox="178 243 724 341">Invite the children to think deeply about the micro-organisms looks and behaviours. Drawing the micro-organisms.</p> 	<p data-bbox="724 243 1312 373">To continue imagining the animals, and perhaps add details to their imagery. Ask them to imagine what the animals look like .Nap room: quiet and defined space.</p> <p data-bbox="724 381 1312 479">Equipped with large boards and paper and sharpies. The intention was that the children had a lot of space to draw details and movement.</p> 	<p data-bbox="1312 243 1864 341">We debriefed what happened before (the pretending). There was a lot of focus with the drawings!</p> 
<p data-bbox="178 836 315 868">Reflection</p> <p data-bbox="178 876 1864 1015">Most children portrayed the animals in the context of the tank. They were tiny dots, exes, and some looked like bugs (Z's). They drew inside the tank even though they were not asked to. They captured the movement inside the tank, lots of dots that were either the animals or the poo, M. and B. drew big (prompted by Teacher M and Teacher S.). There is a diversity of understandings about the way that the “animals” look. Again, I am in awe of this context of inquiry. The children are constructing meaning about a topic that may be outside typical situations and topics.</p>		

Intentions	Strategies	Happenings
<p>To further inquire about the animals. We go back to pretence inferring that since the children had further envisioned the animals through drawing they would now translate it through pretence.</p> <p>Would their embodiment become more detailed?</p> 	<p>Embodying the animals on the outside tank and inside on the stage with one or two peers to collaborate.</p> 	<p>Outside, on the tank the children were invited to become the animals. The sound, the smell could prompt better envisioning.</p> <p>The other children that were on the playground joined us. I could not concentrate on the group as intended. Yet, it was a good invitation to think deeply. We went inside and photographed the children one on one being the animals while their peers watched. This is to invite them to imagine the animals outside pool theatre, to think further about their body, actions, sound.</p> 
<p>Reflection</p>		
<p>This was an invitation to further embody the animals. The aim was perhaps that without the narrative, children would then have more space to further envision them and perhaps create more details about their bodies and behaviour. Having the peers watch this dramatization was also an opportunity for others to think together about their envisioning. This was a rewarding experience. The children were so responsive. I too was embodying another character, that of a theatre director. I rejoice on these multiple roles that I too take during this project. I step outside traditional teaching roles. Now I became an artist. It is important to think with their bodies. We are truly engaging with the multiple ways of thinking during this project. J's is the only micro-organism that jumps, yet later she represents them as the others, crawling. Children's ways of being the animals are being honored here. Each child's unique ways of interpreting the micro-organism is valued. We were also inviting theatricality by posing on the stage.</p>		

Intentions	Strategies	Happenings
<p>Continue to think about the animals with another language. If indeed the animals were the sympathy then we need to “live with the idea” for a while.</p> <p>After revisiting the previous drawings, they will then represent with clay.</p> 	<p>Representing the animal images through clay</p> <p>The drawings were set on the platform for the children to revisit their drawings of the animals in the tank prior to engaging with clay.</p> 	<p>We thought that clay was a valuable language that was under utilized for thinking. The representation of the tank did not go too far, so I was curious about clay conjuring up other details that may not be represented through the body. Would the animals have eyes? Would mouths be portrayed? would they have heads or would they be unicellular?</p> 
<p>Reflection</p> <p>Although the children did work together in our makeshift atelier in the community room (the boundaries created by shelves did sustain focus), some representations were not of the animals, but of the children being the animals, as they were looking at the pictures, and represented themselves literally. Had I been an artist I would have been able to predict that. I felt incompetent here. Looking back, though it was not a waste of children’s time, as they collaborated, they practiced representation through clay, and hopefully thought a little more about the animals. I think that to learn how to speak in other languages is one of the structures that need to be worked on. Reggio pedagogy pays attention to this by having focused sessions in the atelier to spend time developing skill and learning the languages “alphabets”. It is important to share this because when I read the unfolding of project work, the setbacks are not usually shared, leading us to believe that the teachers made all the “right” decisions. This discourages teachers to try, as they may be led to believe that only very special teachers can do this work. Yes, this work involves roadblocks and it is liberating to share this ineffective strategy. Z. said that her representation was a ballerina... not even the animals! Revisiting with the group did not yield much thinking and conversation. This is an entire new practice at the centre. We were making the road as we walked: using clay to represent a focus, think with their bodies, drama. These languages were all explored at the centre, but within the context of free play, not as a focused way to think about something with the language. Clay is not a language to pursue at this point. If I were a teacher at the centre I would take one step back and work with the children on observational representation through clay.</p>		

Intentions	Strategies	Happenings
<p>Revisiting in Group and in pairs the story of “The Animals that Eat Poo”</p> 	<p>Group revisiting did not elicit theory making or any type of conversation so we decided to work one-on-one with the children.</p> <p>In the Research office we gather the children to see the slides on a big computer screen.</p> <p>After showing images of the steps of the investigation, we asked:</p> <p><i>We are curious about these animals. The story is not over. What would you like to know about the animals that eat the poo?</i></p> 	<p>Even one on one the children seemed at the same time excited in having an adult interested in their thoughts, but at the same time the small space made the children fidgety. Group revisiting has never elicited much focus. Besides, rather than invite conversation after each slide, I should have just showed them the pictures and then converse at the end. We tried again with one or two children at a time, as group revisiting did not elicit participation. I transcribed children’s sayings and this is what sprung up. Refer to Appendix B.</p> <p>Animal behaviour</p> <p>They hide, play hide and sick, they do tricks (not sure, if this about the visit by Cinemazoo the same day), so we left this out.</p> <p>They eat poo and drink pee and clean the water</p> <p>They come out to play with other animals</p> <p>They get sick when there is no poo for them</p> <p>They swim, crawl, slither, jump (the children showed us how they moved during the revisiting)</p> <p>When there is fire (tank lights), they go home,.</p> <p>Animal Appearance</p> <p>They are black, green, poo colour</p> <p>They are small</p> <p>They have ant bodies</p> <p>They look like worms</p> <p>They have antennas</p> <p>They have feet, face, eyes, nose, no hair</p> <p>Eyes, mouth, no nose</p> <p>They are small like bacteria that eats sugar in one’s teeth. They are good bacteria! They do not waste.</p>



Reflection

Here we get more of an idea of children's meanings about the animals, although I think that the spoken language might have been overemphasized. The aim was to get the children to communicate theories and this they had done through embodiment and drawing (we did not tell them to exit the tank, to slither, to open their mouths to eat). I felt like an interviewer. Not only the children, but I as well am unfamiliar with the practices of revisiting. At times the children would evade the conversation. A., for example, started talking about wolf children and I did not know when she was referring to the micro-organisms and when it was about the animals at large.

Revisiting one-on-one or in pairs is powerful as this is required of the teacher to find the time to relate individually to each child. I do not think that it is impossible in our day to day practices. We need to be more astute to harness the moments when this is possible.

Should we show the video of the bacteria eating? Would this compromise the wondering or intensify it? The children in many ways behaved as the bacteria in the video, twisting their bodies "playfully"! We did not show the video in the end, as we did not want to compromise the imagined image (antennas, ant bodies, feet); They will see bacteria later in school, but how many times will they have the opportunity to speak their unique voice, to create rather than to ventriloquate what is expected of them?

We were considering: play theatre or a book summarizing the investigation inviting the children to perhaps speak about the experience of being the "animal". This book could be used as an introduction book to the building by children. The children would exercise citizenship in teaching others their discovery about the building. We need to think about wrapping up this investigation, as many children will be living for Kindergarten soon.

Intentions	Strategies	Happenings
<p>Pretence with props Since the interest in the tank and animal pretence seemed to be waning, we decided to use props to see if the animal pretence would be revived. As well, we hoped that the emerging script about animal's behaviour in the tank would be deepened.</p> 	<p>We offer props that mimic the equipment related to the tank: pipes, faucets, hoses, toilet seat, the technician's gloves and containers similar to the ones with the technician uses. We had documented that the technician appeared in the previous pretending; also that the micro-organisms got sick during the holiday building closure.</p> <p>A piece of brown cloth delineated the tank We used the nap room, as it had plenty of space to move.</p> <p>We propose to the children the presentation of a play to share what we learned about the micro-organisms.</p> 	<p>We met with the children and introduced the props. M.L. was invited to set-up the tank as the "mechanical" aspects of things seem to interest him. Since he appeared not to enjoy pretending it was important to find a role for him. From then one he became the stage manager. We played with props twice in the nap room when I took notes and Margaret video taped the play.</p> <p>The children were not sure what to do at first, despite the invitations proposed at our meeting before starting the work that day. M.I. and A. leaned against the wall. J. and M. were not present. M. walked around fixing the arrangement of the proprs. S. started embodying the animals right away. I used info talk to describe what the children were doing hoping to make the acting more visible to the others and stimulate them to enter play. The children's actions, interactions and speech were documented and later became the script for guided play theatre.</p> <p>It was powerful to see the different levels of interactions with peers, especially in turn taking being the techician. I noticed that the children would also use info talk to describe their actions, as if writing a script out loud (perhaps influenced by my info talk). They were listening to each other's suggestions and I could see a nice level of negotiation. (hiding, picking up each other's ideas of sitting on the toilet, crawling). When we repeated the experience, new elements were added to the script, such as when M.L. brought small pumpkin shaped baskets to represent the poo, and when C. hid under the blanket to hide. They would giggle under the blanket.</p>





After the second play with the props we suggest the presentation to the children. We brainstorm what we need and who should come. The children suggest: limonade and popcorn amongst other things. We follow-up and make it with them. We also work on an invitation to the play. I transcribe it for them and they draw.

Reflection

Margaret does think that the children's sympathies were being the animal at play. There was much playfulness but also cognition involved, as the children were to envision these animals. We also valued with theorizing with their bodies, by moving. I was always trying to capture children's theorizing with words, but I learned that we should not give so much emphasis to the oral languages. The children were theorizing about how these animals move, eat, play, sleep. Their unique voices was being heard. It must have been powerful for them to have their playful creativity to be recognized by their teachers.

The individual embodiment of the animals to their peers and teachers was interpreted as a solid focus for the children. The guided visualization was becoming repetitive, and shorter each time. Props were in our minds for some time (it had also been suggested by Teacher D. before). We were curious about the props unleashing further imagining. We purchased second hand materials. We offered the props in the nap room, an enclosed, empty space to simulate the enclosure of the tank. Perhaps I should have given them more time with the props with less info talk. I wonder if this modelled to the children a way to script their play. C. announces the moves she will take. We found a way of accommodate M.L.'s style. He wanted to participate, but not pretending, so he became the stage manager. He rummaged the storage room and found mini baskets that became the poo; he also found boxes to become the medicine for the animals. The experience were repeated so that the children can further play with the materials. I will take note of their actions, as this could become a piece to demark the end of the inquiry.

Intentions	Strategies	Happenings
<p>After one more week of pretending to be the micro-organisms, I took notes of their actions and combined them with what had been said during the debriefing session about the way the animals looked and behaved. This was compiled into a script that I then read as the children performed.</p> <p>The experience was based on reading the script that conveys previous enacting and children's words.</p> <p>Performing on the stage at the community room, enlarging it by adding the two platforms that were designed for this purpose.</p> <p>The following week Margaret makes costumes that she has shown to highlight character definition, as there would be no time to have each child design their own (a great addition to the curriculum)</p>	<p>We prepared the nap room again with the same materials, adding the props that M.L. had brought. We met before playing with the props to introduce the experience to the children.</p> <p>We then moved to the experience to the stage to prompt further theatricality.</p> <p>Costumes are shared.</p> 	<p>There was negotiation about who would be the technician and who would sit on the toilet to feed the micro-organism. Different children tried. They enacted the script well, but added some improvisations along the way. It was lovely to see the group come together and cooperate. They were playing together with delight. M.L. would set up the props. There was playfulness, as the children asked me to sit on the pretend toilet to feed the animals.</p> <p>The costumes were received with delight, and some negotiation. They seemed to have added an aspect of theatricality to the performance, as the children seemed to focus more.</p> 

Reflection

This part of the project unfolded fast, as some children would be leaving shortly. As well, it was felt that at this point, the children were ready to end this inquiry, as the actions in play theatre were becoming repetitive and the children played “bio-reactor” and then would disperse. Ideally we would have the children design their costumes, but again, there was no time for that. Margaret sewed the costumes with recycled fabric and offered them to the children. I also cogitated the possibility of having the children write the play, but the challenges that we had with oral collaboration led us to bring together all the play scripts, posing and ideas that were shared in the debriefing session into one piece to be narrated. Had we had more time, the children would probably act out themselves without narration. The script did represent the voices and playful theories of the children, such as for instance, having the animals hide, play hide and seek and escape the tank.

Grand Finale

We consulted the children and seen that they showed interest in a performance for their families to share the learning about the bio-reactor. The children mentioned a party, and food. They also mentioned ballons (but we did not follow-up on the latter). Since they mentioned lemonade and popcorn we made them with the children. I also transcribed an invitation that A. and B co-wrote. We had a full house with their families. The children took the performance seriously. M.L. , the stage manager, asked to be on the stage, and spontaneously welcomed with the crowd by making a sign. It was a lovely way to celebrate the end of a nine months investigation by sharing the learning and having a party. The children and teachers from both rooms helped by setting up the chairs in the community room, creating decoration, such as the painted paper that served as the background, and by decorating the room with recycled paper chains. There was a great spirit of collaboration and celebration. I hoped that this conveyed to the children the importance of the inquiry and the collaboration that took place. Reggio Emilia models this attitude of celebration at the end of a long term project as a way to recognize the children’s efforts and mark an important occasion, that of thinking together for long periods of time. As well, it was important to us that the children shared their learning with their peers and families, as they then actualize their strong competence.

Appendix B.

Conversations with Children

A. and M.I. Visit the tank

A: "Look, the bubbles. The bubble is coming up in the water". "The bubble is coming up in the water", she repeats.

Elaine: "The bubbles in the drawings that you have."

A: "The bubbles are coming up and pop in the water."

Elaine: "I wonder what happens when it bubbles."

A.: "Why do the lights go swish? Why do the lights go on and off?"

Elaine: "Why do the lights go on and off"? Mia, you have something to say?"

M.I: "The pee and the poo goes through here."

Elaine: "The pee and the poo goes through here."

M.I: "And then it goes up and down and up here."

Elaine: "And then it goes up and down."

A: "I was making that one" (Does she recognize that she too had the same understanding?)

Elaine: M.L. is nearby. "M.L, come here, you did the drawing too."

Elaine: (returning) "The poo goes here. M.L, do you remember? You made some pipes."

M.L tries to open the gate, Elaine leaves holding hands to take him back to the playroom. M.I and A. continue the exploration.

A: "The lights go swish, swoosh. It goes from up to here and then it goes down. The pee is going down."

M.I: "This is "elextricity" and elextricity make the poo and the pee get burned."

M.I: "Read that word. It has numbers."

Elaine returns

A: A looks at Elaine and shares: "ohhhh. These things I was reading. The water on the other side. I saw this pile (the inverted V representing the tank?). And I think this and this", and points to the top and bottom panel. "They have numbers everywhere."

Elaine: "You think that they are connected?" (The two panels)

A: (Inaudible). A. points to the red button. "This one turns."

Elaine: "I wonder about these numbers."

Elaine: "M.I has something to say."

M.I "The poo and the pee turn into bubble."

A. "The poo and the pee turn into bubble."

Elaine: "[I] get it."

A: "And this makes swish, swash". She goes back to the lights, which started the conversation.

A: "That is why it goes swish, swash. It goes to the bubble machine and it makes water and it makes swish, swash."

Elaine: "So the poo and the pee turns into bubbles and this shows it."

Elaine: "I wonder about this swish, swash and the bubbles."

M.I M.I asks A. something (inaudible).

Elaine: "This is really neat. Cause you know what you were doing? You were being a scientist. You are making sense of things. You are trying to figure out how the tank works."

M.I: "That is the red button, this is the water, this is the bubble machine and it comes here."

A: "I need something. This button tracing the lines upwards and this button brings the pee up. That's this button."

Elaine: "If he (technician) presses this button than you think it turns on the system?"

M: "If you press this button, than it can make it stop."

Elaine: "So you think that this button starts the whole thing. If you turn it on the system will turn it into bubbles."

A: "You turn it like this. This goes to the water tank, going like this (tracing the lines) and that's why it makes bubbles."

Elaine: Tracing it. "This is where the pee water goes. You turn on the tank and it starts working it into bubbles."

Elaine: "You know what I think? Remember we heard the noise outside?"

A: "The microphone."

Elaine: "Yes, we taped the noise on the microphone. What was the noise about?"

Children appear distracted.

Elaine: "We can talk about the noise later."

M.I: "Why do you use a microphone?"

Elaine: "So that we can tape it and hear it. So later we can hear what you said and tape it down. So we can think about the noise later. Just think about it the poo and the pee, and the water, after it bubbles, what happens?"

M.I: "I want to tell you something."

Elaine. "Tell me something, M.I."

M.I: "It goes out here, down, down, down and it comes here (points to the red button) and then it stops."

Elaine: "So all the pipes. Remember, M.L showed us all those pipes. It goes here, here, here and it starts to make bubbles. That's what you said right?"

Margaret: "They are going for lunch."

Elaine: "Everybody, there was a lot of thinking happening today and the two of you were listening and helping each other think."

Conversations at the revisiting sessions with images

Revisiting with A

M: "Oh, do you know what I think about this? Here is the toilet, and this is the dirty water. It goes to the clean water, comes back here, goes back here and there."

Elaine: "You showed us how the bio-reactor works."

M: "So it flushes. It goes right here, pop, air. It says pop, it goes down here. Oh, I remember that. Oh. We are drawing the tank. We are hearing the tank."

M: "Do you know what I think? I think that the orange things are actually the animals."

Elaine: "Let's look at the orange things. This one?"

M: "Maybe these ones are. I don't think they have eyes. They only have a mouth. Just like worms."

Elaine: "What do you wonder they look like?"

M: "They try to get up with their hands like this." M. starts slithering.

Elaine: "Like a snake, like a worm".

M: "Yes, like a sea snake".

The slide viewing progresses.

M: "I asked what the blue thing is and I forgot. The poo is gross. It is like mud."

Elaine: "We can't see the animals."

M: "Because the poo is on top. Right now. Right now the animals are breathing. They are under the rock."

Elaine: "What is their colour?"

M: "Same colour as the poo."

Margaret: "If you were dressing-up, would you wear poo colour? What else would you look like?"

M: "I would lie down (he then pretends to be the animals showing how they move). I know, I know, slug ears."

Margaret: "Like an antenna?"

M: "So that they can eat people."

Elaine: "Think about them inside the tank."

M: "They get out of the tank. They use their walking and they slither (inaudible) and like a zebra and a lion."

M: "Magic. They get out of the tank. If someone steps they be someone else."

Revisiting with A.

The same of previous investigations are shown.

Elaine: "Where are the animals?"

A: "They are hiding."

Elaine: "They are hiding?"

A: "Because one time, I got my computer. I got a story from my phone. Animals are hiding because they are scarred of people. That was my message."

Elaine: "So you think that the "animals" are hiding because they are scarred of us?"

Elaine continues reading the story of the story that we put together revisiting the steps taken so far in the investigation. "R. opens the tank. They are so small that we can't see them."

A: "They are hiding over there. Maybe they are hiding in there."

Elaine: "On that side?"

A: "Like I got a message they like that side and they are playing. They play hide and seek. And that's me. I was so much excited."

A: "Some animals are not scarred, but these ones are."

Revisiting with Z.

- Elaine. "I can't see the animals. What do they look like? Do they have bodies like us?"
- Z: "Bugs do not have bodies. Bugs have ant bodies." She then moves to the stage and crawls and then she makes a bridge pose.
- Z: "They stand up like this."

Revisiting with M.I and J.

- M.I: "Why does it turn like that?" She is pointing at the movement in the tank.
- M.I: "I think this is the pee."
- J: "And here is the poo."
- Elaine "Where are the animals?"
- M.I: "Under the poo."
- Elaine. "What is this clean water out of the tank?"
- M.I: "The poo and pee got mixed. The poo comes to here." The dirty part of the tube that R. is holding that has poo and water separated.
- M.I: Pretending to be the animals. "They are swimming."
- J: "They eat each other." (She opens her mouth and makes crunching sounds).

On the stage embodying the animal M.I pretends to swim and J. jumps. J. starts jumping when asked to pretend to be the animals.

- J: "Frogs jump like this."
- M.I: "They swim and they jump."

Revisiting with M.L

- M.L: "I already know about the tank."
- M.L: "That's when it was stinky."
- M.L: "What is A. saying to M.I?" He is looking at the picture of the two observing the panel).
- M.L: "There is a strainer in there. There is a smaller tank with a bigger pipe than that one."
- Elaine. "What does the strainer do?" Do you want to say something? You like machines and tubes."

M.L: "Collecting sample. Clean water. More clean water."

Elaine. "So, how about this?"

M.L: "Orange."

Margaret. "Do you know what the orange is?"

M.L: "It's a map, not a picture." He sees his slide that prompted the investigation.

M.L: "Go back to the panel. See, there are not as many lights as Z's paper."

Elaine: "You said low and high pressure?"

Margaret. "Is this panel okay?"

M.L: "There are two red lights. That's not okay. Only one is okay. There is a red light."

Margaret: "Do you think there is a problem?"

M.L: "R. said. And M. had a question about it doesn't look the same out there. Like out there. M's question."

Margaret: "He thought that the panel should look exactly like the tank?"

M.L: "No, no the outside. The lights."

M.L: "Do you know what *correnta* means? It's electric in Italian."

Elaine: "Do you know the connection between the panel and the tank?"

M.L: "Two lights again. Different picture."

Elaine: "I thought this one would be of interest you."

M.L: "That one is air."

Elaine: "Why there is air in the tank?"

M.L: "It turns the water. That pipe. And it will clean that."

Elaine: "Why there would be air in the tank?"

M.L: "Well, in the pipe. There is a pipe going there. It means the water that flows to here can go here. The one you turn this one. The water in there get bubbles."

Elaine: "What is the connection between the pipes and the animals?"

M.L: "When you turn this – this out. When you turn that the water cannot flow. The yellow. The blue is for air. You know when we started I was wondering what was under that wood. "(The cover of the tank)

Margaret: "Did you hear something and wonder what it was? How did you know there was something under it?"

M.L: "Now I know."

Margaret. "I wonder why you thought something might be under it"

M.L: "And the bigger tank has a bigger pipe. And has a hose like a hole. That is why R. has a bucket on top".

Margaret: "You know the system pretty well."

Elaine: "Do you know why there is a tap for the water and a tap for the air?"

M.L: "It can make bubbles when we turn that. It can make bubbles in the water that comes through here. Why doesn't that have yellow?"

Elaine: "Good question. I do not know."

M.L: "There is two. How do we switch if off?"

M.L: "Ahhh! That one is dirty."

M.L: "And that one is bubbles and that one is poo. Inside here is where the animals live."

M: "Ahhh! Taking sample. See. That's the hose and that is the other picture."

Elaine reads the slide. "What would you like to know about the animals that eat the poo?"

M.L: "Nothing. I already know."

Margaret: "Do you know what they look like? That is my question."

Margaret: "They look small. Do they have hair?"

M.L: "No."

Elaine: "What do they look like? What is your idea?"

M.L: "They do have feet. They do have a face."

Elaine: "What else?"

Margaret: "A face that has everything"?

M.L: "Eyes and a mouth."

Margaret: "Yes and a mouth. No nose?"

M.L: "Yes, nose."

Margaret: "So they look like you?"

M.L: "No, cause they do not have hair."

Elaine: "How about their body? We know that they have feet and a head with eyes and nose and a mouth."

Elaine: "What does their body look like?"

M.L: "Their body inside is different. They are smaller because the animals are small. Even pipes are smaller. There are hearts and bones."

M.L is invited to pretend to be the animals. He smiles and says no. Margaret asks about a colour and he says black. He is given paper and pencil so he can show what the animals look like by drawing (a language that he is skilled at).

Revisiting with C.

M.L. is present and he is drawing.

M.L.: "You know the animals got sick when we were not here?"

Elaine: "Did you know why?"

M.L.: "There was no pee and poo."

M.L.: "They do have pipes otherwise all the water will stay on the floor."

C.: "Sleeping." It sounds like a waterfall."

M.L.: "The tank is cleaning."

Elaine: "How about the animals?"

C: "They are eating the poo and pee."

Elaine "What is he (the technician) doing?"

C: "He is taking the sample of the water."

Elaine: "Do you remember the sample?"

C: "We looked for a long time and it looks different. It looks like yellow stuff cleaning the water."

We are up to see the poo poo and the pee pee.

Elaine: "And the animals. Do you remember what Rudolf said?"

Elaine: "What do the animals look like?"

C: "I just want to watch the video again. A conversation about the movie Frozen unfolds. I bring her back to the animals. C. is asked about their colour.

C: "Black."

Elaine: "Do they have a body? What do they look like?"

C: "I think that they are just like of animals."

Elaine: "What kind of animals? Body? Hair like us? They are so small. We haven't seen them."

C: "I want to see a picture of them on this."

Elaine: "A real picture? Don't you want to imagine?"

C: "No, I want a real picture of what they look like."

Elaine: "I will talk to Margaret and I will keep this is mind."

C: "I think that they are as small as bacteria. If you eat candy, it goes into your teeth and you have to go to the dentist. It eats sugar. It makes holes in your teeth cause it tries to find the sugar."

Elaine: "Some animals look like bacteria?"

C: "Well, there are some nice bacteria. They like the tooth paste and that kills bacteria. There are no nice germs; there are only mean germs."

Elaine: "Do you think the animals in the tank do good things for us or are they bad?"

C: "They eat poo. They don't have to waste."

Elaine: "When they eat poo, what happens to the water?"

C: "The water gets washed. Can I listen to the rest of the story?" It is the last slide.

Elaine: "We are working on it."

Revisiting with A.

Elaine: "Remember the panel?"

A: "Yeah, fire."

Elaine: "Is it what it does?"

A: "It's fire."

Elaine: "What happens in the tank then?"

A: "The animals go back and they go home."

Elaine: "They go back home when it is red?"

A: "And when it is raining. When it is yellow. It stops."

A: "Maybe the panel was running out when the sun was coming. That is why R. (the technician) comes."

A: "When like someone poo it go to the animals and they eat it."

A: "I hear something. I hear the water."

A: "And there is something up there. Yeah. Like a computer."

Elaine: "And we were wondering what happened to the poo and the pee."

A: "And that's the tank and those are the bubbles and that's the poo right there."

Elaine: "Where are the animals?"

A: "They are hiding."

A: "Because one time I got my computer, I got a story from my phone. Animals are hiding because they are scarred of people. That was my message."

Elaine: "So you think that the animals are hiding because they are scarred of us?"

A: "Some animals are not scarred of people but these ones are."

A: "Maybe there are hiding over there. Like I got a message. They like that side and they are playing. They play hide and seek."

Elaine: "Some are clean and some are dirty. How do they get clean?"

A: "R. reaches out so he does not get poo in it. Gloves."

A: "When I saw that I throw up."

Elaine: "Do you know how the water gets clean because it is all poo there?"

A: "The hose. Maybe some animals walk out to find some little guys to play with."

Elaine: "Remember when we were playing some animals escaped the tank? We were pretending on the stage."

A: "One time I got back in because I saw a little wolf and I shoed it away and I got them back in."

Elaine: "What would you like to know about the animals that eat the poo?"

A: "Sometimes I saw them climbing on the wall. They have big claws and climb. (Is she talking about the micro-organisms or the Cinema Zoo animals that were brought to the centre that day?)

Elaine: "What is their body like?"

A: "They are green. Tricks to do."

A: "They like to slip and climb on someone's face."

Elaine: "Do you think these animals are naughty?"

A: "Not really naughty. And sometimes he lets us pet him (connections to the Cinemazoo visit?)

A: "Tarantulas."

Elaine: "How about the animals in the tank, how can we pet them?"

A: "You pet them in the back, like that."

Elaine: "But they are so little."

A: "But this was a big one. I just pet it." (She seems to be talking about the animals brought to the centre that morning for a birthday party.)

A: "Tentacles."

Elaine: "Would you like to pretend to be the animal so that we can take a picture and put the story together."

Elaine: "You said that the animals in Cinemazoo eat carrots and vegetables. How about ours, do they eat carrots?"

A: "Ours eat poo."

Elaine: "You said the animals are green and they swim?"

A: "I can sew"

Elaine: "You can? Do you think we can sew the costumes?"

A: "Yeah but my mommy needs to help."

A. continues the conversation about the animals the Cinemazoo animals that visited the centre that morning.

Reflections

Role of the Teacher

I take the more traditional role here at times by asking questions to get the children to share what they know. It is almost like I am assessing what they have learned so far. The intention in showing the slide was to re-connect with previous investigations and feed the imagining of the animal; and yet I asked way too many questions. Sometimes, it did support the children in communicating questions, theories and imaginings; yet I think there were too many questions, and I was being too focused on what they learned so far!

Revisiting Process

Rather than ask questions, we should perhaps just show the images and read the story and leave it to the children to ask questions or make comments.

The children at times wonder off (talking about movie Frozen, the Cinemazoo visit, and previous stories: Wolf Children). Is this developmental? Does the revisit experiences trigger these thoughts? Or are they evading the experience? They did get back to the bio-reactor conversation, though.

Narratives

We can see the beginning of narratives in the children's comments. Should we propose these as a plot for their enacting, rather than getting them to "write a script?" Rather than writing, they could perhaps revise it. I could read their comments and they would then pretend. Would this be more in line with our reality? Is the writing of a "play" too ambitious a project?

The transcripts above review:

Animal Behaviour

They hide.

They play hide and seek.

They do tricks (Not sure, Cinemazoo?).

They eat poo and drink pee and clean the water.

They come out to play with other animals.

They get sick when there is no poo for them.

They swim, crawl, slither, jump.

When there is a fire (lights of the tank), they go home.

Their Body

They have slug ears (antenna).

They have ant bodies.

They are black, green, poo colour.

They are small.

They have ant bodies.

They look like worms.

They have feet, face, eyes, nose, no hair.

Eyes, mouth, no nose.

They are small like bacteria that eats sugar in one's teeth. They are good bacteria.

Sustainability

C. makes the connection about poo being recycled (it does not waste).

Appendix C.

High Teacher Control/High Children's Freedom

<p>High Teacher's Control</p> <p>We invite the children to explore the building (walk, touch, feel, listen).</p>	<p>High children's Freedom</p> <p>Children free to participate in their way bringing to attention elements of the building that intrigued them.</p>
<p>High Children's Freedom</p> <p>M. brings attention to the bio-reactor panel and draws it.</p>	<p>High Teacher's Control</p> <p>With his permission, we share his drawing to a group of children. (We tiptoe. A walk in sight?)</p>
<p>High Teacher's Control</p> <p>We invite the children to visit and draw the panel.</p> <p>Children make oral and graphic observations.</p>	<p>High Children's Freedom</p> <p>Children make oral and graphic observations.</p>
<p>High Teacher's Control</p> <p>We gather the children to revisit their drawings.</p>	<p>High Children's Freedom</p> <p>Children have the choice to make comments about the drawings.</p> <p>Children inspect drawings and make comments.</p>
<p>High Teacher's Control</p> <p>We in promptly invite the technician to present the panel to the children and ask them to draw it again.</p>	<p>High Children's Freedom</p> <p>Children have the choice to make comments about the drawings.</p> <p>Children are invited to ask questions and make comments. They draw their perception of the panel.</p>
<p>High Teacher's Control</p> <p>Guided by our group discussions, Dawn (one of the teachers) invites Gael to teach us about the system. G. is known for understanding the sewage system having experiencing previous toilet flooding.</p>	<p>High Children's Freedom</p> <p>Gael discusses the sewage system with M.I (who is a member of our bio-reactor group). Together they construct meaning about its functioning.</p>

<p>High Teacher's Control</p> <p>We visit the panel as a group and read the information that Gael shared with us.</p>	<p>High children's freedom</p> <p>In discussion with the group, Marcus makes a connection between the panel and the bio-reactor tank and asks to visit it.</p> <p>Lead by the child's invitation, we visited the panel: listening, feeling, touching it and discussing first impressions. Alice, who was not part of the group, sees us outside and asks to join the group.</p>
<p>High Teacher's Control</p> <p>I invite M.I to chaperone A. to the panel to share insights and capture Alice's observations.</p>	<p>High Children's freedom</p> <p>A. and d M.I deeply engage with the topic, sharing previous learning and conjectures: strong engrossment with the panel. Strong relationality and peer scaffolding.</p>
<p>High Teacher's Control</p> <p>After revisiting, children draw on top of the tank their perceptions of what is happening underneath.</p>	<p>High Children's Freedom</p> <p>Children draw the envisioning of the tank Using their imagination and perceptions possibility strengthened by the sensorial exploration with the tank.</p> <p>Children participate in reflection in visiting each other's drawings.</p>
<p>High Teacher Control</p> <p>We ask Rudolf the technician to open the tank and present it to the children. Revisiting with slides.</p>	<p>High Children's Freedom</p> <p>Children make comments and ask questions. Opportunity for reflection.</p>
<p>High Teacher Control</p> <p>Exploring of another language of inquiry: Guided imagery with the information that Rudolf gave us (also a form of revisiting).</p>	<p>High Children's Freedom</p> <p>Children embody the animals following their imaginings with playfulness and humor (animal sounds, crawling, jumping, hiding, and escaping the chair circle that represented the tank.</p>

Appendix D.

Reflections

Pit Stop

When to offer resources to support learning?

How to elicit children's theory making?

These articles were not new to me, but being immersed in research I feel more equipped to distill the nuances about the role of the teacher in supporting the children to theorize. It reiterated the teacher's strong role in inviting and sustaining theory making from the children. Are the children theorizing? What we making their thinking processes visible?

In the Snow project, the teacher did bring resources to the children such as pictures of snowflakes at the beginning of the investigation and later a clip about snowflakes being formed (after a child presented an understanding similar to the original). Reflecting on this I realized that it would be okay at this point to show images of the bacteria eating because they are in reality very similar to the children's representations (except for the mouth). In the Snow Project the question permeated the investigation: "How is snow made"? What is the question that we are pursuing in our project at this point? We know that the animals are the children's sympathy. What is their question pertaining to the animals? We need to find out.

How? Debriefing one on one or in groups of two? We did pose this question during the last revisiting. I think that we need to pursue this further. Children's theories need to be at the forefront of this investigation. Perhaps representing the animals through clay or having each child photograph each other in an animal pose may invite more theory making, suggesting that the children think more deeply about the animals.

Again, in the scent project, the teachers tried to detect children's questions about scents. After several sensorial explorations, a bouquet of fresh flowers is brought to the room; after smelling it and commenting, the teacher posed a question. "How does smell work?" Later, they brought flowers to the room and asked the children to move away and close to the smell (being constructivist here to see the connection with the nose being close).The teacher asks a question: "How does the flower gets from the flower all the way to your nose?(there is a teacher's strong presence here. He devised the question after asking the children to experiment smelling close and far). After discussion, the teacher invites the children to draw their theory.

It has become clear to me that we need to do more work in supporting the children in theorizing about the animals, since this is such a strong sympathy for them. Perhaps, through theorizing a deepening of the play script about the animals eating poo' theatre could materialize. These are some possibilities:

Debrief the experience with a two children at a time, as we have challenges talking to the whole group. We ask what the children would like to know about the animals.

Simultaneously, we would intently work on theory making:

Engage the children in representing their animals through clay. (To support them in formulating their questions/theories). Where? The devised meeting space upstairs? Should we ask the

children to individually pose as the animals, have a child photograph it and then represent it through clay?

Revisit with the images of the tank and their drawings again; this time with two children at a time. Document their responses.

Maybe show video of animals eating poo if their clay representation is not too different from the way the animals look like, as their drawings showed. We do not want to convey that the animals need to be a certain way.

Cadwell (2003) instigates my thinking with the following question:

“What is the relationship of now to the children’s inner symbolic life?” In our project, I think there is a lot to do with detecting how the animals connect with the “children’s inner symbolic life”. The animals eating poo intrigue the children; what are their theories about animal behaviour in the tank? Is this what the children want to know? Debriefing with slides and representing in clay could give us some answers.

Are we listening to the children?

“What does it mean to listen and participate?” (Rinaldi, 2006). We listen with our eyes, with your enthusiasm, with words, with drawings, with standstills.

Are we too language bound? Questions may not be articulated as questions, but as a desire, an analogy. M. says “I wish I was a tiny animal in the tank” Here there is a possible question about the life of a micro-organism in the tank.

What is attention? What is engagement? The children in the bio-reactor project appear restless. Are they attuned to this work? Are they “listening” to inquiry and to the other participants?

It is challenging to keep track of and follow up on children’s comments when we are at the centre only once a week; besides, there is also interruption due to holidays, children’s absences and long naps.

I can clearly see the value of taking pauses as suggested by Margaret so as to study our documents to ensure that we are trying to deep listen and follow up on children’s comments, questions and theories, as they are scattered in different documents. We are taking steps always based on discussions and previous happenings, but how deep is this listening?

I can see that we aim at fomenting participation and discussion by highlighting for the children the value of observation, looking closely, and sharing comments with others. Given the newness of group discussions as a pedagogical practice at the centre, my expectations are perhaps too high. In a way they are listening by wanting to join the group every week, and by responding, albeit momentarily, to our invitations for inquiry. Would there be more focus if I were at the centre every day?

I need to further study their comments to decide about how to proceed.

Bio-reactor panel

Children notice the lights, the big red bottom, the pipes, the tank, and the bubbles.

These are their comments:

C: "Some lights are off and some are on."

M: "Four lights on. Nine lights out. Maybe Rudolf turns on some lights when he gets here."

Teacher scaffolds trying to connect the children to the symbols of traffic light: red, yellow, green. It confused the children.)

C: "Maybe yellow means go."

C. "Maybe these lights control traffic lights."

Teacher invites children to think about what the panel says.

M: "Toilet flush, turn, turn, turn. The new water comes in and out. Down, down (traces the V tank symbol).It comes down here. It goes ssshhhhhshshss (flushing sound). It comes here again."

Elaine: "Why are these lights on?" I ask (Was it important to make a connection at this time?)

M: "It comes upstairs, playground. There is a black tank upstairs."

Elaine thinks about going outside to explore it. M. articulates the thought. "Let's see it."

This was a strong moment of mutuality between teacher and child.

The Tank

The children are invited to visit the tank. M., Z., M.A and M.I. A spontaneously joins the group.

A: "It smells bad."

C: "It smells like poo and pee."

M: "They fix poo and pee here."

M: "Poo, pee, dirty water?"

M: "A different accident. A different sound."

Z: "Very loud. A different noise."

Z.: "It sounds like water."

C: "It sounds like a stream."

M: "It sounds like a water fountain."

Z: "It sounds like a water fall."

Elaine: "What happens with the sound?"

M: "The poo and pee with the water."

Reflecting on challenges with the structures that facilitate long-term investigations

In part, our struggles in carrying on a long term investigation with the children pertain to the foundational work that facilitates inquiry, representation and children's participation. The child care centre is new and the culture of collaboration to grow curriculum is emerging. Long term projects with children was a new practice, and this presented a strong challenge for us, in that many times the newness of working this way affects children's engagement during our work. The challenges that we encountered are in the following areas:

- Structures for dialogue. Could a space within the centre be set up as an atelier? A space that conveys to the children the importance of focused work
- familiarity with exploring the arts to thinking with and representing a topic
- teacher's involvement and commitment

Dialogical Structures

Videos review that the children are at times engaged with listening, yet not much is said during our revisiting experiences or during discussions; the children seem to get easily distracted.

Are our expectations of what it means to participate too high? Had the children had more exposure to collaborative discussion at UCC, would their participation be higher? Work is being done at the moment with the philosopher in residence to create a culture of thinking and discussion. Had this work started before our investigation, would the children be more engaged? I think that the skills to dialogue need to be cultivated daily as part of the on-going curriculum. Perhaps I way to start would be to discuss story books with children. In the beginning of the year, as part of the general curriculum planning, this work would be articulated and follow through at team meetings. If long-term investigations are a goals, intentional curriculum based on dialogical skills are essential.

Places to Meet to Carry on Investigations

I can see why the studio plays such a big part in the investigations at Reggio Emilia. It is a place that invites focused work, as the distractions are minimized. I wonder if the place sets the tone of importance about the work being carried out. Being smaller than the regular classrooms, it may invite the children to pay more attention to each other's thoughts and representation. I have seen the studio being described as a lab for experimenting with thinking and representing. "The space plays us" Fells proclaimed in her Drama in Education course. In a lab, the coats that the researcher wears, the glasses, the counters and instruments summon the researcher to behave in a lab like manner.

We tried to gather at different spaces with the children, and each posed some challenges. Would we have had the same challenges had we had a studio, a lab for thinking and representing?

These are the spaces that we tried based on availability of room at the time we met every week:

The loft

The children rarely inhabit the space, so it is bewitching to the children, as they climb the couch, look outside the high window, climb under the meetings tables or watch the classroom below through the slats. Even though we usually give the children to play in the space first, they are

often distracted by it. The noise from the classroom below is also another point of distraction. We tried the improvised meeting room with a little more success, but the children often climb the benches to look down. What an interesting curiosity that could also be harnessed for curriculum: seeing the school from the top!

The Community Room

Because the room has a stage, we thought that it would be ideal to meet there on the stage and then set out to dramatize. I was hoping that meeting on the stage would be a way to bind the group towards later dramatizing the micro-organisms. The room is beautiful and invites exploration with the blocks, dress-up, and pretend cooking. A few times the children lost interest in discussing and dramatizing preferring to play instead with the other materials in the space. Is the room too distracting or the children's brief engagement connotes lack of interest in our propositions?

The Nap room

The emptiness of the space could minimize the distractions, but could also invite running and physical exploration (the children climbed the columns a few times during our explorations). Maybe we should persist about meeting in this space. The challenge is that at times the mats are already in place for nap or if we gather in the afternoon, some children are still sleeping and the space cannot be used.

Margaret's office

We had some success in the space, although the children did climb chairs (this is fine, though, as they are kinetic thinkers, and climbing the chairs may alleviate the tension of the small space. It came up with my discussions with Margaret that my expectation of what means to participate may be too high. Being fidgety, climbing chairs, moving a lot, climbing chairs, standing, may be the way four year olds engage.

Even considering that the expectations may be too high, I still wonder if a defined studio space would conjure up stronger engagement (with some movement.....)

Should we try from now on to meet at a permanent space to see if the "routine and familiarity" with the space will support stronger dialogue?

Readings about project work do not seem to convey these types of challenges. Is the Reggio Emilia atelier the antidote to the challenges that we are having with engagement?

Familiarity with the Cognitive Approach to Art

The intentionality in monopolizing in the languages of the arts to think with the topic would support the children in exploring a topic.

Drawing

I fathom that drawing theories may be one the skills that the children already have from previous work done at the centre, for there were not challenges in drawing the functioning of the tank from memory and drawing the panel from observation. Some of the drawings even included the pipes that carry the dirty and clean water! Good envisioning at place!

If thinking through the arts is an intention, I think that this is an area of the curriculum that also needs to be constantly pursued during the everyday explorations at the centre, such as:

- drawing the forest that they often visit
- document through drawing the observations about transformations in the garden
- drawing the seeds collected in the Fall.
- drawing the plants that survived the winter
- drawing the block structures that are constantly being created

Clay

My guess is that the children are used to playing with clay, but not thinking with clay to investigate a topic, for the children did not fully engage with representing the tank through pictures. Was the invitation too dull (pipes, hoses and faucets? Or more guidance was necessary? I am thankful that Teacher M. took this on in setting up the clay exploration. It was brief though, with M. being the only child representing the tank with some guidance. I am not sure how long this experience was offered, or if it would have been more fruitful to work with our group alone in a smaller space .A studio would have been optimal.

It is not surprising then that our first invitation to represent the tank with clay on the platform in the community room was not successful. Judging from the children's response of bodily engagement with the clay (stomping, rolling on it), I fathom that this was the first time that the clay was set-up on the platform, which is typically associated with climbing and jumping in play. Interestingly, after playing with the clay, M. then set-out to represent the hoses. I think that we may have abandoned this work too soon. We passed it on to the teachers. Teacher D., A. and M. did try to offer it but it was not clear if there were interesting responses for I did not receive documentation. Perhaps I should have asked them to document, beyond assuming that they would.

These are the lingering questions:

What is engagement with invitations for experiences and discussions for four year olds?

Would more exposure to dialogue facilitate deeper thinking and representation?

Are the spaces available to us too distracting? Should we "stick to" one space?

Teacher involvement and commitment to long term investigations

The structure of collaboration had been explored with the teachers since the start of the centre. Meetings with the administration and researchers were held weekly but were cancelled due to issues with routines and transitions. The teachers have one hour a week to work on their pedagogical narrations, but I wonder if the pedagogical narrations are being shared with the team to solicit perspective and inform curriculum planning. The teams from each side meet weekly during nap. I wonder how prominent discussions about curriculum planning are at these meetings. If there is planning for curriculum, it is not obvious. The choices for free play appear limited to me. There is an art shelf with a small selection of supplies (paper, pens, pencils and sharpies), scissors and glue. If art is a prominent language, should the selection of materials to children be more varied? I see drawing and painting experiences, but not much more. The dress-up and kitchen areas are in the community room, but these options are not always available by choice, as a limited number of children can be there at a time. The children seem to roam. Is play at the centre too free?

My question here is: Are the teachers being intentional about the plans for the day while open to the surprises that the children bring? Could the environment be enriched with more open-ended materials to construct and design? Can there be some continuation with the invitations presented to the children every day? I am assuming that the lack of involvement with our project is happening due to the casual ways in which curriculum is planned at the centre. This needs to be a question to ask the teachers.

The teacher's engagement with our project is marginal. Each week a teacher joins our investigation pending on availability. I wonder if the happenings of these investigations are shared with the team. Should we be more proactive in writing a summary of the investigation soliciting perspective? Should we resume the post-investigation meetings? Should we try to have one consistent teacher to be part of this investigation? I do not see much enthusiasm for this project. For me it appears elusive to the teachers. The teachers are in and out, just as I perceive their work to be.

Is this due to the newness of long term investigation at the centre? Is this work too demanding beyond the level of knowledge and comfort with the topic? Should we be more pro-active in engaging them with our work?

Informal script that the children developed through playing with props.

Attempts were made to keep the order of events according to the unfolding of children's play. At times, the points were connected when there was repetition or when their actions invoked a scene.

Animals are in the tank.

R. comes. A. suggests that we start the poo theatre with someone speaking.

The animals run around.

They crawl fast.

They eat the poo and drink the pee.

The animals are having a play date.

There is an animal on the toilet.

The animals are sleeping.

The animals wake up.

There is rain sound.

The animals are home.

They hide when Rudolf comes.

It says "The humans are trying to check on us."

They get scooped by the technician

It says: "Now we are gone."

The animals are sick R. turns off the tank.

R. cleans the tank

R. gives them medicine. One is bubble cleaner.

They get cleaned up and they are not sick anymore.

Rudolf checks the temperature. "It is 89 degrees"

The animals come out of the tank.

"They can't stay out for a long time or they can't breathe"

R. says: "Do not get out again."

"They play hide and seek."

"It's their favourite game."

(Addition from April 2nd)

"There is no poo anymore".

J. goes to the toilet.

Animals eat.

"We need drinks and our drinks are pee."

R. pees.

The animals drink.

"And they live happily ever after".

M.L moves the bubbles with a fan, fixes the tank re-connecting the pipes), gives the animals medicine and brings small orange baskets to the tank to represent poo.

Appendix E.

Samples of Pedagogical Narrations

Interconnectedness The Building Investigations



C. listens to the wall.



M.L. and R. observe from the loft.



M.I. photographs the playground. The children engage with the windows rescuing Tommy, the Teddy stuck on the high window sill.

The children, teachers and researchers have been exploring the building. This intention stemmed from considerations that this being a new building with modern, open, bright and avant-garde environmental systems that produces energy, harvests and recycles water, the children could benefit from engaging with it is beauty and offerings. The focus for the exploration started to emerge as the children deepened their acquaintance with the building by touching, climbing the column in the nap room, exploring the loft, listening to the building noises and rubbing its textures and photographing by some of the children. These investigations started late Spring and involved some of the children that were departing for Kindergarten such as M.I, G., N., C. and M.O.



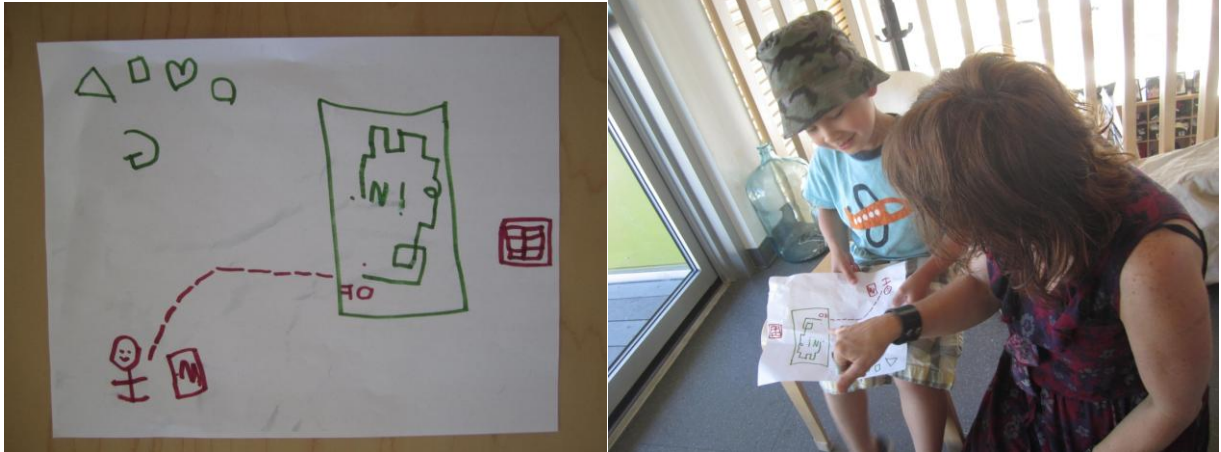
Climbing the columns.



Tracing different textures.

We were unsure about what this would lead us to, but were open to the invitations that we either thought about or that originated from the children, or the negotiation between both. We could have explored the lines, the height, the windows, and yet, M.L. one day inquired about the bio reactor control panel located in the North cubbie room. Clearly, we were all listening to the possible entries to this wondrous subject matter and it looked like the panel invitation could be a pretext for a project amidst all the other possibilities that we had in mind.

A pattern of listening started to emerge; this choice of studying the bio-reactor panel being a combination of many ears and eyes. I fathom that the state of attentiveness to the building had its genesis in the sensorial explorations that were taking place, a state of being with the building. From her office, K., the administrator heard M.L. inquire about the panel. K. then informed me about this intriguing curiosity. I then pursued this with M.L taking him to the panel to observe and chat. He did not engage in conversation at the time, but later voluntarily presented a picture with his theory about the panel and a system. M.L. at the time called it the “solar panel”. With the hope of engaging the children with M.L’s curiosity, his drawing was shared with the children at group time. We had a hunch that the bio-reactor could become the pretext for a long term project about the building. Although M.L was encouraged to speak directly to the group, he chose to have me present it instead.



M.L.'s pictures seemed such a strong provocation for us to study the environmental aspects of the building. We did not have a strong reaction from the group, but they generously listened to the offering. This group of children were taken to the North side cubbie area to draw the bio-reactor panel to make acquaintances with the topic.

Fortuitously, R., the building technician was checking the panel one morning. He graciously accepted an impromptu request to show the panel to the children in the north room. He opened it, mentioned the lights, the tank and explained the recycling system. Despite the clear and generous presentation, neither the children nor I seemed to comprehend the intricacy of the process; however, this presentation was helpful in highlighting the importance of the panel to the children. It was also enriching that the community is being active in educating the children, just as it should. The children and teachers were learning from a direct source.



After R's presentation the children were invited to draw the panel. Despite the difficulty with connecting lines, the children focused on this endeavour, and what stood out from the drawings were the many lights. This, I presume, was related to R.'s emphasis on the lights informing the health of the system. Or perhaps, the many minuscule lights are intriguing on their own, so many, so small, with different colours. Investigating the lights became one of the possibilities. We revisited the drawings as a group in attempt to co-construct meanings and be attentive to the perceptions of the children.



The children as a group draw the panel from observation. M.L scaffolds M.I's drawing.
Revisiting the drawings.

Some children left for kindergarten. We then invited a few children to form a project group, as some of these children at some or many of the previous investigations about the building, and hopefully had developed a state of attentiveness to their surroundings and some curiosity about the topic. We revisited some previous explorations through power point and again visited the panel, hoping to continue the noticing of the lights, the buttons, and the lines.



Z. draws the panel from observation
M.I. revisits her drawing.

The children speak about R.'s visit at our next meeting with the panel.

C: ***“What did Rudolf say?”***

Elaine: ***“He explained how the system works”. Rudolf explained the lights. Do you remember?”***

C: ***“Some lights are on and some lights are off.”***

M: ***“Four lights on, nine lights off”. Maybe Rudolf turns on some lights when he comes here.”***

Elaine: ***“What do the lights say?”*** My question seemed opportune because their drawings abounded in depiction of the small lights on the panel, so I was curious about the meaning that children were making about them.

I then try to scaffold the children prompted by teacher M's suggestion about making an analogy with the traffic lights that they are familiar with. It did not elicit a fruitful response in connection with the panel, although it did invite the children to think.

C: ***“Maybe yellow means go”***

Z: ***“Maybe these lights control traffic lights.”***

The analogy of the traffic light did not foment strong connections to the panel. At another group gathering, the children were invited to engage with the pedagogical narration that Teacher D. composed about G.'s understanding about the bio-reactor, a gift of his learning to the centre children prior to his departure for Kindergarten. G's theory about the connections of the panel and the clogging of toilets in the children's bathroom prompted M. to articulate his own understanding about the system to the attentive ears of M.I. and Z.



A light bulb went on. M. traces the lines of the panel while excitedly articulating:

“Toilet, flash, turn, turn, turn. The new water comes and comes out.”

“Down, down, shrammm, sharammm”. He traces the V representing the tank while saying:

“Comes down, down here. It goes flashhhhhhh and it comes over there again.”

“Why are these lights on” I untimely ask hoping to provoke M., M.I. and Z. to extend their thinking. I got no response. It seems that this is the time to abandon the questioning about the lights. M. continues:

“It comes upstairs, playground, the tank, upstairs. There is a black tank upstairs. Let’s go see it.”



M. theorizing about the functioning of the panel and tank



We visit the tank.

Reflections

I can see how powerful it is to revisit previous explorations with children to bring focus to the investigation. I am reminded about how drawing foments thinking, since many times, as M. did with the sounds to communicate the mechanical process of the tank, we lack the words. Not everything can or need to be said with words.

How many times in our busy days do we stop to listen to children's thinking? I was in absolute awe of M.s' enthusiasm and focus in describing the water purification process. I presented myself as available to listen. M.I., Z., M.I and C. were contributing to the group by being attentive listeners and observers. Would have M. articulated his understanding without his peers' and teachers' impetus to listen? As well, we were listening throughout this investigation, by inviting the children to draw, study and revisit their drawings together, but taking their clues about the sympathy behind the many possibilities.

These narrated moments to me symbolize interconnectedness between people. I am grateful that K. was, like the children, attentive to the building by sharing M.L's question about the panel with me. Through the act of listening, we started becoming invested together in this quest to learn a little about the powerful building. The panel bio reactor panel spoke to us, spiking our curiosity. We do have a video explaining the system, which at some point may be shown. The crux of the matter is that we are constructing meaning in relation, and the outcome may be even bigger than the understanding of the water recycling system.



Z. and M. revisit previous explorations

My attempts to focus on the lights were fortuitous, by we did pursue the lights based on the representations on the children's drawings; but I can see that I may have brought up the lights at the wrong time; maybe they are not at the moment what captures the children's sympathies. Or I could have asked M.'s and the group to elaborate on his comment that "Maybe R. turns the lights on." If not for this pedagogical narration, I would not have been able to analyse our choices in the attempt to harness children's curiosity and invite them to dig deeper into a topic. That is such a challenge, but also the beauty of practice, as the children's responses can be unpredictable and thus one can never be fully prepared.

Interconnectedness also became apparent in the revisiting of the pictures showing previous investigations and in relating to G's understanding about the bio-reactor and the panel. Would have M. described his theory without the prompting of G's explanations?

As the lines of the bio-reactor depict the various points of connection of the recycling water system, so are we, teachers, researchers, administrator, technician becoming inter-related, developing a kinship through the investment in and support from each other in our efforts to keep this curiosity alive and learn ourselves about sustainability.

Although the topic of investigation did not come from the children, we were open to their offerings such as the depiction of lights in M.I.'s and Z.'s drawings, and M.I.'s drawing of the bio-reactor panel. The children may get an understanding of the complex building living system, but my hope is that in this process the learning pertains to listening to others, inquiring out loud, strengthening connections to people, nature and material, and meta-cognition, or learning how to learn. We have in mind possible artistic forms to ignite and sustain our thinking, but which will also culminate in something that further provokes and marks our learning: clay, drama, wire? We did not know which step to take after the revisiting of the experiences, visiting the panel and the drawings, and yet, through patient listening and deliberation with others, a point of interest emerged: the tank. One needs to trust the process! We are now studying the tank. This reflection is to be continued

The Bio-Reactor Project

"In-tens [t]ions"

Large Drawing of the Micro-Organisms: What are the next steps?



Some children from the bio-reactor project group at work: Z., A., M.L. and M.I.

Margaret and I have been planning experiences together. At the meetings with the teachers, we tried to gather insights into what was explored and invite discussions about interpretations and possibilities to continue the bio-reactor exploration. The investigation reflected upon here has yet to be shared with the teachers.

After seeing the open tank and listening to the technician, we decided to review the process through drama, given the high energy of the group and my curiosity to apply drama for inquiry. The children seemed curious about the movement, smell and the new learning about micro-organisms inhabiting the tank. So, I set out to narrate the steps through guided visualization. I was curious about what part of the process most intrigued the children, the mechanisms of water recycling that had captured their wonder or the micro-organisms that they had learned about? That is when the children started playing micro-organisms creeping and crawling, jumping, slithering, swimming, and hiding. We did this visualization many times, with each session including the new details that entered the story, one of them being the escaping of the tank. Since the imaginative conceptualizations became repetitive, we decided to invite the children to think deep about the looks and behaviours of the micro-organisms through drawing. In retrospect, perhaps I should have asked the children to draw their understandings from the visit to the tank prior to doing the visualization. Would the micro-organisms show up in these drawings?



The step was full of intention, but as I write this I start questioning this choice. If the animals are invisible in the tank, the children inferred that they are small. Does our invitation to draw big compromise this understanding? Is this why most of the children continued to draw the animals small?

The intention was for the children to consider more details about the micro-organisms' bodies behaviours. Attempting to connect with the exploration in a sensorial manner, the children briefly embodied the animals before they drew.



At times teacher S., Margaret and I circulated the room to connect with the children, provide information talk or to listen to their comments. We could not discuss the drawings with the children at this time, as there were six children in the room, and their drawings were complex. I realize here the importance to revisit these drawings at a later date, as drawing proved again to be a powerful language to express understandings. They abounded in details.



M.'s and B.'s drawings portray large organisms (with a mouth as "they eat the poo.") J's, A's and M.'s and Z's, continued to create the animals in a small scale. These animals were represented within the process of the tank: toilets, pipes, tank moment, and the toilet waste. The children seem to understand the process very well. What else is there to construct? Can and should this understanding be enriched?

There were brief discussions with some children. This taped documentation is to be analysed. Hopefully they will provide further insights into their thinking. I realize the challenge in taking

notes while engaging with the children and I am thankful that the experience was being recorded, providing data for further analysis.



Z. and M.I study the M's drawing with the magnifying glass

It is intriguing that out of the six children, only two drew the animals big as proposed. Most of the drawings conveyed the animals within the functioning of the tank, depicting movement, water, pipes and waste. Does this indicate that the animals are not the main sympathy of the children? Are they more intrigued with the process of recycling and the structures that facilitate this work? I realize how challenging it is at this point to make an intentional decision for the next step in this investigation. I can see then the importance of soliciting multiple perspectives from others in this process.

Margaret suggested that we could perhaps reconnect with the panel that launched this investigation. If this is a step, then how can we go about it?

In conversations with teachers, A. suggested that we continue the drama; whereas M.'s curiosity relates to the physiology of the micro-organisms. These are all possibilities to be considered.

These are my questions: Is the real sympathy for the children the animals of the work that they do? If it is the work, is it really important to further explore their image? Another point of contention for me is: Should we focus on the "real science" of these organisms or should we capitalize and sustain an imaginative interpretation? Can both perspectives co-exist?

I have been thinking about Biesta's (2012) critique about Constructivist theory, in that the teacher has a fixed goal for the learning, and set pathways for the children to discover through exploration what she determines to be important to know. In our case, it seems that is the understanding of the functioning of the bio-reactor. We are trying, however, to capture a bigger meaning, but so far, it hasn't been clear to us what it is. My other wonderings are: If our focus is the investigation of this generous, green building, its eco relevance and "specialness", then would the micro-organism study detract from this focus? Is the big meaning the discovery that such small animals can be so powerful in that they are vital in repurposing the water?

Is it time for the children to convey their current understandings through one collaborative representational piece representing this exploration?

When projects are presented to educators, we tend to get a summary of the happenings and the decisions, what leads us to believe that the process is effortless “The children did this, and we responded like that”. I am discovering through this project, that decisions instigating and sustaining inquiry are complex. The challenge lies in finding a focus, or the big meaning behind what may appear obvious.

What further complicates the process for me is not being on the floor with the children every day, so as to engage with their wonderings about this topic of investigation.

Below are some possibilities constructed with or suggested by Margaret and the teachers.

- Attempt to detect the bigger meaning of this exploration to the children.
- Revisit the last drawings individually to gather more understanding about the representations. Or have a pair look at each other’s drawing with the magnifying glass
- Re-connect with the bio-reactor panel.
- Bring materials that mimic the tank for representation and dramatizing with props to offer a space for the blooming of other ideas and supporting enacting with props.
- Propose script writing with the children for the “poo theatre”.
- Continue with the clay, perhaps representing their last drawings (not the pictures of the tank.
- Focus the science of the micro-organisms (observing a sample in the lab).
- Solicit parent involvement/ perspective sharing.

I am looking forward to perspectives from Margaret and the teachers. I now understand Margaret’s intention in proposing a pause for this project, to study our documentation, to gather multiple perspectives and analyse the many possibilities before taking action. We are indeed living the struggles defined as the intentions of this research! Listening does take time (Rinaldi, 2006). The thing is I am bothered for not knowing how to proceed. Is this because I do still subscribe to the image of the teacher as all knowing? Or is it because my passion for this type of work compromises the standstill required to study the work, reflect and basically take a breath during this walk.