A Case Study Examining the Skills and Dispositions that are Developed in a Unit of Inquiry as Students and Teacher Adopt an Inquiry Stance to Learning in a Mainstream Primary School Classroom

Thesis
By:
Hannah Mc Kenna

Marino Institute of Education

Supervisor: Dr. Siobhán Cahillane-McGovern

Submitted in partial fulfilment of the requirements of the award of the degree of Master in Education (Inquiry Based Learning)

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Declaration

I hereby declare that this dissertation is a presentation of my original research work.

Wherever contributions of others are involved, every effort is made to indicate this clearly.

This work has not been submitted previously at this or any other educational institution. The work was done under the guidance of Dr. Siobhán Cahillane-McGovern at the Marino Institute of Education, Dublin. I agree that the Library may lend or copy this dissertation upon request.

Hannah Mc Kenna
Dedication

I would like to dedicate this work to my late mother, Eithne Reid Mc Kenna, who started this inquiry journey with me and sadly is not here the day I finish it.

She departed this world far too soon but who shines through me.
Acknowledgements

I wish to acknowledge with gratitude the many people who have helped and supported me in undertaking this work.

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To my family and friends, you have been my support system throughout my life, which pushes me to fulfil my dreams and aspirations. I especially want to thank my late mother Eithne, father Oliver and sister Jane, who have always encouraged me to reach for the stars.
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Go raibh mór maith agaibh go léir.
Contents

Declaration ............................................................................................................................................................................ ii

Dedication........................................................................................................................................................................... iii

Acknowledgements .............................................................................................................................................................. iv

Abbreviations ..................................................................................................................................................................... x

List of Tables ..................................................................................................................................................................... xi

List of Figures ..................................................................................................................................................................... xii

List of Appendices .......................................................................................................................................................... xiii

Abstract ............................................................................................................................................................................ xiv

Chapter 1 Introduction ......................................................................................................................................................... 1

Research Title .................................................................................................................................................................... 1

Introduction......................................................................................................................................................................... 1

Aim and Focus of the Research ........................................................................................................................................ 2

Rationale for the study ........................................................................................................................................................ 2

Format of the Research Study ............................................................................................................................................. 3

Outline of Research Study .................................................................................................................................................. 4

Conclusion ........................................................................................................................................................................... 5

Chapter 2: Literature Review ............................................................................................................................................. 6

Introduction......................................................................................................................................................................... 6

Inquiry Based Learning ...................................................................................................................................................... 6
Limitations ................................................................................................................................. 40
Conclusion ................................................................................................................................. 42

Chapter 4: Findings .................................................................................................................... 43
Introduction .................................................................................................................................. 43
Participant Profile ...................................................................................................................... 44
Inquiry Unit .................................................................................................................................. 45
Theme 1: An Emerging Inquiry Stance ....................................................................................... 48
Theme 2: Multiple Skills and Dispositions Developed in an Inquiry ......................................... 49
Theme 3: Recursive Nature of Skills and Dispositions ............................................................... 64
Theme 4: Teacher Learning – My Journey of Inquiry ................................................................. 66
Conclusion .................................................................................................................................. 71

Chapter 5: Discussion .................................................................................................................. 72
Introduction .................................................................................................................................. 72
Main Findings .............................................................................................................................. 72
What are the skills and dispositions that are developed as students and teacher adopt an inquiry stance to learning in a mainstream primary school classroom? ......................... 73
How does teaching through inquiry enable the students to problem solve? ......................... 78
How does teaching through inquiry enable students to act with agency? ............................. 80
Additional Findings .................................................................................................................... 81
Conclusion .................................................................................................................................. 82

Chapter 6: Conclusion ................................................................................................................ 84
Introduction................................................................................................................................. 84
Summary of Key Findings.................................................................................................................. 84
Limitations........................................................................................................................................ 85
Recommendations............................................................................................................................... 86
Conclusion......................................................................................................................................... 87
References ......................................................................................................................................... 89
Appendices ....................................................................................................................................... 97
**Abbreviations**

BOM – Board of Management

CPD – Continuing Professional Development

EAL – English as an Additional Language

HO – Higher Order

IBL - Inquiry Based Learning

IRE - Initiation, Response, Evaluation

IRF - Initiation, Response, Feedback

LO – Lower Order

NCCA - The National Council for Curriculum and Assessment

PSC – Primary School Curriculum

SEN – Special Educational Needs

UK – United Kingdom

UNCRC - The United Nations Convention on the Rights of the Child

UNICEF - United Nations International Children's Emergency Fund

USA – United States of America
List of Tables

Table 1  Blooms Taxonomy  13
Table 2  Qualitative vs. Quantitative methods of research  28
Table 3  Validity Table  33
Table 4  Data Table  35
Table 5  Six Phases of Thematic Analysis  37
Table 6  Data Collected  44
Table 7  Each Groups Starting Point for Revision Stage of the Inquiry Cycle  58
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Inquiry Cycles</td>
<td>9</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Stages of Kathy Short’s (2009) Inquiry Cycle Explained</td>
<td>47</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Themes from Data Analysis</td>
<td>48</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Questions the Children Asked as Recorded in Observation Notes at Stage 1</td>
<td>49</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Skills and Dispositions the Children Developed in this Unit of Inquiry</td>
<td>50</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Selection of Concept Maps</td>
<td>51</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Identification and Solution to a Problem; Level 2 of the Problem Solving Process</td>
<td>52</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Questions Commonplace Throughout the Data</td>
<td>55</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Irene’s See, Think, Wonder Worksheet</td>
<td>56</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Researcher’s Notes</td>
<td>59</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Different Creations by the Children when they had Control of their Learning (Agency)</td>
<td>60</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Faith’s Belief in her Ability to see herself as an Agent of Change</td>
<td>61</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Grace’s Story Showing the Importance of Picking up Litter</td>
<td>62</td>
</tr>
<tr>
<td>Figure 14</td>
<td>Concept Maps</td>
<td>64</td>
</tr>
<tr>
<td>Figure 15</td>
<td>Questioning and Critical Thinking Skills Emerging Together</td>
<td>66</td>
</tr>
<tr>
<td>Figure 16</td>
<td>Posters Created by the Children for Group Presentation</td>
<td>67</td>
</tr>
<tr>
<td>Figure 17</td>
<td>Photographs Taken by the Children During their Environment Walk</td>
<td>69</td>
</tr>
<tr>
<td>Figure 18</td>
<td>Poetry from Hannah, Ian and Daisy’s group</td>
<td>79</td>
</tr>
</tbody>
</table>
## List of Appendices

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>Inquiry Unit of Work Plan</td>
<td>97</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Stages in Analysing Different Data Types</td>
<td>103</td>
</tr>
<tr>
<td>Appendix C</td>
<td>Data Analysis – Coding</td>
<td>104</td>
</tr>
<tr>
<td>Appendix D</td>
<td>Outline of Data Collection</td>
<td>105</td>
</tr>
<tr>
<td>Appendix E</td>
<td>Letter to School’s BOM</td>
<td>106</td>
</tr>
<tr>
<td>Appendix F</td>
<td>Consent Form (Parents)</td>
<td>107</td>
</tr>
<tr>
<td>Appendix G</td>
<td>Consent Form (Children)</td>
<td>109</td>
</tr>
</tbody>
</table>
Abstract

Inquiry based learning as a teaching practice makes an important contribution to primary education in Ireland as the fundamentals of inquiry; questioning skills, problem solving, critical thinking, agency and collaboration are knitted within the Irish primary school curriculum. This case study is a small scale research project that identifies the skills and dispositions that are developed in the early stages of a unit of inquiry as students and teacher adopt an inquiry stance to learning in a mainstream primary school classroom. This case study was located in the qualitative paradigm. An EMIC insider approach was used where the researcher taught a unit of inquiry to her 18 third class pupils, giving opportunities for data collection that would not be possible from an unknown researcher to the children. The researcher employed a range of research instruments to support the findings; children’s work samples, photographs, researcher and observation notes to obtain the data. Findings portray that multiple skills and dispositions are developed in engaging with an inquiry. It was also shown that these skills and dispositions develop in unison and not in isolation. Adopting an inquiry stance did not come naturally to the children within the study and the data illustrated the importance of the role of the teacher in learning through inquiry.

Keywords: inquiry based learning, inquiry cycle, children’s agency, skills and dispositions
Chapter 1: Introduction

Research Title

Examining the Skills and Dispositions that are Developed in a Unit of Inquiry as Students and Teacher Adopt an Inquiry Stance to Learning in a Mainstream Primary School Classroom.

Introduction

This chapter endeavours to introduce the reader to the research study. The background to this study and rationale are explained. The aims and focus for this research are identified. Finally the expectations of the study are outlined, as well as a guide to each chapter for the reader.

In recent years there has been an increasing interest in inquiry based learning. While a variety of definitions are suggested, there are many different components that fully encompass inquiry based learning. Short and Burke (1996) recognise “inquiry has come to have many different, often contradictory, meanings” (p. 97). The researcher takes the view that encompasses inquiry based learning as being learner led, where the learner establishes what is fascinating to them and in turn investigates actively what they wonder about. Inquiry changes the way to view learning whereby when one adopts an inquiry stance to learning it “underlies our approach to living as learners, both within and outside of school” (Short, 2009, p. 11). One views the world through a different lens. At the core of inquiry is the child leading their learning which promotes a child to develop their agency. In engaging with inquiry one engages with questioning, problem solving and critical thinking. In inquiry, value is placed on learning in a collaborative community. Through discussions and investigations on their
learning journey the children come to new revelations. This may lead the child to developing as a citizen in their community and taking action to become an agent of change in some way to make their life better.

**Aim and Focus of the Research**

The primary aim of this research was to identify what learning skills and dispositions developed in teaching and learning through inquiry. The first challenge was to decide how the researcher would best answer this question. A case study approach was chosen, where one could see through a real life example the skills and dispositions that are developed through an inquiry based approach to teaching and learning. A unit of study, based on our environment was constructed, to be taught to the researcher’s own class of eighteen third class students. See Appendix A for the complete inquiry unit plan.

**Rationale for the study**

The researcher qualified as a primary school teacher in 2012. Over a five year period, the researcher began to notice that after a topic had been taught to the children, the majority of the concepts were forgotten when it was revisited, unless it was meaningful for the children. In the work of Short (2009) she recognises the importance for learning to be meaningful, otherwise the children forget the information as it has been presented in a way that they have not connected with. The researcher began looking at alternative ways of teaching to make learning meaningful for the children, when she found the concept of learning through inquiry. Through inquiry the children embark on a learning journey based on connections that they
make between their own lives and the learning opportunities presented to them. In turn, presenting learning that is meaningful to them.

The more the researcher read the more interested she became in inquiry based learning. In international research it was visible where countries were integrating inquiry into their teaching. In the United States of America Buhrow and Upczak Garcia (2006), state that they began introducing inquiry through questioning in the classroom. The researcher strives to teach the children in her care to the best of her ability. She felt that she could explore better pedagogies in teaching, thus why she embarked on this study.

**Format of the Research Study**

This study was designed using a case study approach, which aims to illustrate first-hand the learning skills and dispositions that develop through adopting an inquiry stance to learning. Using a qualitative approach enabled the researcher to explain how certain skills are developed with the children throughout. The researcher argues that the children’s own work samples coupled with teacher observation in a real life example is the best way to illustrate the skills that the children develop through inquiry. On the other hand using a case study approach with a small number of children has limited scope but provides the reader with knowledge of how skills and dispositions developed in this real life classroom. The findings presented here provide an insight for the reader to begin the thought process of incorporating inquiry based learning into their classroom. This study can be altered and amended to suit specific settings and to test the hypothesis in their situation.

Following the decision to embark on a case study the researcher developed a unit of inquiry to be taught to her own class of third class pupils. This unit of inquiry was based on
SKILLS AND DISPOSITIONS DEVELOPED THROUGH INQUIRY

our environment, with the central idea for the children to develop was; in interacting with
natural habitats, humans make choices that have an impact on other living things. See
Appendix A for the complete inquiry unit plan. Through the inquiry the children and teacher
followed Kathy Short’s (2009) nine stage inquiry cycle (Appendix A) as one way to teach
through inquiry. This unit of inquiry was taught over a six week period. Data was gathered for
the first six stages of the inquiry cycle (four weeks), which would inform the teaching of the
final three stages.

Outline of Research Study

This research study consists of five chapters. Chapter one introduces the reader to the
research study where the aim, rationale and format of the research study is discussed.

Chapter two reviews and critically analyses the relevant theoretical policy and practice
literature in inquiry based learning. From an analysis of the literature available to the
researcher at this time, highlighted the limited availability of Irish literature in inquiry based
learning, therefore the majority of the literature in this chapter is from international sources.

Chapter three explains and justifies the methodology used and the motivation
underpinning these choices, as well as providing the relevant literature that supports the
choices made. A qualitative case study approach was chosen where the researcher argues that
the children’s own work samples coupled with teacher observation in a real life example was
the best way to illustrate the skills that the children develop through inquiry. The researcher’s
position is discussed within this chapter as well as the ethics surrounding the study. Validity
and reliability are noted which illustrates the trustworthiness of the study.
Chapter four presents the findings from this research. The researcher reveals the skills and dispositions that her students developed while engaged in inquiry. For the most part this is done through “narrative text” which best suits the display of the qualitative data collected (Creswell, 2003, p. 234).

Chapter five discusses the findings from this research in terms of the research questions and relates the findings back to the literature.

Chapter six concludes the research study, stating the limitations of this study and provides recommendations for future practice including the researcher’s own practice and the wider education circle.

**Conclusion**

This chapter outlined the aim and focus of this study, the rationale that underpinned it, as well as the format and outline of each chapter within this study. The following chapter will now review and critically analyse the relevant theoretical policy and practice literature in inquiry based learning.
Chapter 2: Literature Review

Introduction

This chapter will review and critically analyse the relevant theoretical policy and practice literature in inquiry under a number of headings. The researcher begins by focusing on the literature in inquiry based learning in general. The researcher then examines one way of teaching inquiry; through an inquiry cycle. Following this, the skills and dispositions that one acquires through adopting an inquiry stance to learning are reviewed. The majority of the literature available for this study comes from international sources, but where possible the researcher includes the works of Irish researchers. In summation, the learning skills and dispositions that develop throughout a unit of inquiry are examined along with the literature underpinning inquiry in general.

Inquiry Based Learning

Inquiry based learning has come under the spotlight in recent years as a new way of teaching within the classroom. However, the grounding for inquiry based learning is heavily linked to Dewey’s (1916) philosophy of education, where Dewey “emphasised the importance of motivation, social interaction and collaboration…and helping students to learn through problem solving” (Guccione, 2011, p. 515). Although inquiry based learning may have a new title, it is not a new pedagogy; the importance of teaching through inquiry has been noted for years. One may ask, what is inquiry based learning?

Inquiry based learning is student led at the core. Inquiry allows children to build questions and wonderings on knowledge that they have acquired to date themselves. Inquiry has the possibility to go in different directions with different student groups. Walking into a
classroom, where the children are learning through inquiry, the classroom would be as Wolk (2008) describes it “filled with the voices of children taking an active role in their own education” (p. 118). It is the children who are asking the questions and locating answers through the inquiry, not just the teacher.

When a teacher engages with inquiry based learning and adopts an inquiry stance to learning their pedagogical practices change. Similarly, when a child adopts an inquiry stance to learning they are now leading their learning. The children are developing the ability to make educational choices and decisions. In turn the teacher is sowing the seeds for the children’s agency to grow. Inquiry and agency develop together as the learner takes control of their learning. Taking an inquiry stance does not just mean that a child will learn in a new way but they are also taking a stance to social change and social justice as Liebermann & Miller (2001) explain.

Agency is central within inquiry where in order for agency within children to be effective, it needs to be student centred. In 2017, a school based project was established, aimed at focusing on social justice in an area in the United States of America, where children were guided to become agents of change in their local community. In order for this project to be successful, it needed to be “student centred, in that children think about how the problem affects their own lives, and that the children work collaboratively to design and implement the project” (Torres-Harding, Baber, Hilvers, Hobbs & Maly, 2017, p. 4). In a nutshell, this project encompassed the definition of inquiry, where the children identified and solved the problem, connected to their own lives.

Since the child is at the fore when teaching through inquiry, teaching is directed and guided by what interests the child. When a child is interested in learning, they have the ability
to learn in abundance and to want to further their own learning. As a result, Buhrow & Upczak Garcia (2006) explain that through inquiry “their desire to learn is high” (p. 22). In life everything is done when people have an innate interest in it, learning is no different. When children engage with what they are learning, they will continue on this path with their own learning, long after what began in the classroom. As Wolk (2008) notes, when one tells a student to sit and listen to a teacher this will not spark this innate interest in learning, but through a child engaging with an inquiry it has the ability to do so. Through inquiry based learning our minds can be shaped to view the world with curiosity and question what is happening around us. In turn this creates a school community where curiosity thrives (Engel, 2011). One may pose the question as to how one can create in their pupil a world of curiosity and one answer is teaching inquiry through the lens of an inquiry cycle.

Inquiry Cycles

As discussed above, inquiry based learning is a stance that emphasises self directed discovery to learning and problem solving. There are many ways of encompassing inquiry into a classroom. One of those ways is following one of the numerous inquiry cycles available. Pedeste et al. (2015) explain that educators and researchers have created inquiry cycles from their knowledge of historical instructional models and adapted with their current knowledge to form what they believe to be the ideal way to carry out an inquiry cycle. All of these vary greatly however Pedeste et al. (2015) recognise that the one common feature between them is that most have five phases: “Orientation, Conceptualisation, Investigation, Conclusion, and Discussion” incorporated in them, adapted and reworded to fit individual cycles (p. 54).
Kathy Short (2009) created a nine step inquiry cycle, titled The Authoring Cycle as shown in Figure 1. This cycle is made up of recursive arrows which emphasises Pedeste et al.’s (2015) point that “inquiry based learning is not a prescribed, uniform, linear process” (p.49.). In comparison Justice et al. (2001) created a nine step inquiry cycle but his view did not place importance on the recursive nature between the stages with the cycle (Figure 1). Instead, he placed value on self reflection and self evaluation throughout the cycle by placing it in the middle, where this self reflection and evaluation is at the core throughout this cycle. The author’s vision of a cycle is clear through the creation of their inquiry cycle.

Figure 1

Inquiry Cycles

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<tr>
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<td>![Inquiry Cycle Diagram](Source: Short, 2009, p. 19)</td>
<td>![Inquiry Cycle Diagram](Source: Justice et al., 2001, p. 6)</td>
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Inquiry cycles are all different but act as a guide for teachers and learners to knit the practice of inquiry and the central idea in learning together. How long one spends at each stage in the cycle will vary. All inquiries are different and will not follow a stepped process,
they will follow the direction that the children are travelling with their learning. Kathy Short (2009) placed the stage of Connection outside of the circle in her inquiry cycle. In doing this, Kathy Short (2009) illustrates that this connection with the children’s own lives plays a key role throughout, not just at the beginning.

**Connections**

Throughout the literature on teaching through inquiry, a key feature is connection, which is also a key feature in the literature on children’s agency. When the researcher refers to connection, she is referring to the connection a child has with his or her own life and the world they live in. Without having that connection, children do not see the need for change in certain aspects of the world around them. Without this connection it is hard to vision how learning fits into their own life. In inquiry one must find the connection to make learning meaningful. When there is no connection Short (2009) explains that “learning is experienced as isolated ideas and information” and it is easily forgotten (p. 14). Learning is meaningless if a child cannot see where the learning fits in their life. Therefore, a clear starting point for inquiry is with the learner’s own life and experiences. As an inquiry unfolds if a connection has not been engrained in the children Smith (2007) have said that “there is little chance that the forms of care essential to environmental and social stewardship will emerge” to enable children to become change agents (p. 192). Living within their school and geographical community a connection is formed with a place. Malone (2016) explains that children can “believe they are capable of making a difference now and in their future lives” (p. 116), when they have that connection to a place. Inquiry is rooted in connections to the children’s lives. In order for learning to be meaningful and remain with the children, the connection is required.
To develop children as agents of change, children need to witness first-hand the changes happening around them, on a small scale, local level at first where the child is connected to that local place. Then this can be built upon on a larger scale, to a national or global level. Winograd (2016, p. 6) echoes this, where he feels children need to become agents of change, “with the immediate classroom and then gradually extend out to the school, neighbourhood and larger communities”. Having this connection makes learning real to the children. If a problem is too large and on a global scale the child does not have the vision to see themselves involved in change if they have not experienced it on a small scale at first. Short (2009) notes within a study of an inquiry on human rights with children, at the Tension stage within the inquiry cycle the researcher realised that the children needed to take action in their own school context at first, at a level that is real to them. The children did not have that connection globally in order for their action to be meaningful. It is evident that whatever lens one looks at engagement with children and the actions that the children take, connections need to be present from the outset, with other pieces of the jigsaw added as the children progress. Another one of these pieces to inquiry based learning is collaboration.

**Collaboration**

A key feature with inquiry is that aspect of having a community of learners collaborating. One does not learn in isolation, regardless of age. Children have always learned from one another but in inquiry this goes further. In the words of Short (2009) “inquiry goes beyond cooperation to collaboration where students think together, not just work together” (p. 17). Teaching children to work collaboratively with others, equates to a richer outcome for all involved, which begins with the teacher modelling and creating a collaborative learning environment for all. In a school based study in the United Kingdom, while exploring the role
of children as agents of change, in order to develop a more sustainable community Percy-Smith and Burns (2013), recognised this need for both connection and collaboration. The children gained a sense of ownership over the process, where they were eager to make the community more sustainable, where adults and children were working as a partnership.

Collaboration is key for a learner to develop their academic skills as well as their social skills. Every member within the community of inquiry is collaborating with one another, to learn together. Inquiry naturally builds a child’s collaboration skills, as well as their social skills and how they interact with one another. Once the foundations of connection and collaboration are established within the children, other skills and dispositions can begin to unfold. Inquiries are centred around questions with others, therefore it is important that one would extend and develop their questioning skills in engaging with inquiry.

**Questioning Skills**

Inquiry naturally encompasses a problem or a question in its realms, where “questions fuel the inquiry” (Wolk, 2008, p. 120). Through inquiry, teachers provide opportunities for the children to develop their questioning skills, both lower order and higher order and this begins with modelling questioning skills. Children learn a lot from what a teacher models, therefore in order for the children to develop their questioning skills, teachers need to be good at asking a variety of questions whether it be for understanding or analysing, with a combination of both higher and lower order questions, which is illustrated in Bloom’s Taxonomy in Table 1.
Moyer & Milewicz (2002) note that teachers who can use a variety of levels to question “are better able to discern the range and depth of children’s thinking” (p. 293). A good question will determine how a child will think about a problem or concept, therefore is key for a child furthering their own learning. Within an inquiry the leader’s questioning skills need to be developed as well as that it is hoped that the children’s questioning skills will develop throughout an inquiry. In one study in the United States of America by Buhrow and Upczak Garcia (2006), they began introducing inquiry through questioning and spent an abundance of time, helping the children to develop their questioning skills. They found that putting time into questioning during the inquiry resulted in the children becoming more independent in their inquiry following this. When a teacher focuses on a child’s questioning skills, their metacognition is built upon simultaneously. Quigley, Marshall, Deaton, Cook &
Padilla (2011) have identified various questioning techniques, the most common questioning technique used by teachers is Initiation, Response, Evaluation; (IRE) however this can increase passivity of students in the class and can reduce discussion. The questioning technique Initiation, Response and Feedback; (IRF) is closer to what a conversation entails and allows a discussion to follow after feedback is given from the teacher.

In inquiry teachers take a step back and guide the children through their learning, at the same time as giving control over to the children, of their own learning. Hedges & Cooper (2018) legitimise that it is asking a teacher to do the opposite of “long standing ideologies” (p. 373). In inquiry, teachers step in when appropriate, where the children require an interaction to move their learning on to the next step. This change in thinking about how a teacher interacts with their pupils leads to repercussions that are outstanding. In a study in the United States of America, one teacher notes that she “watched amazed as my students asked questions, shared information and excitement, and attempted to document their thinking in an informative and aesthetically pleasing way” (Guccione, 2011, p. 516). This being the result of a teacher learning to let go of control and trust the research results would unfold in her classroom too where her students would use the skills that they had learned through the inquiry process (Guccione, 2011). Although recognised that giving control of learning to pupils is a hard concept for a teacher to untangle, the results are evident. The results from research illustrate endless learning, when a teacher does travel through inquiry with the children.

In an inquiry, through guidance from the teacher, the children establish what is of particular interest to them, what frustrates them or causes a tension or a problem within their inquiry. A teacher works from where the child drives the learning. Short (2009) clarifies that “although we may be able to predict those tensions, we cannot determine what will cause a specific learner to feel tension” (p. 16). Where a teacher thinks a unit of work in inquiry may
lead could result in the opposite. Similarly, when guiding children to become agents of change, children are required to investigate a problem and then in turn make a change for the better, to diminish the problem, according to what is meaningful to them.

Claxton (2008) recognises the importance of learning as a process and not an end goal, where through the process the children develop questions and are given the opportunity to reflect on their learning. The children are never finished a topic, but learning through inquiry is a process. Children are opened up to this learning climate, of questioning what is happening around them to uncover many problems in the world to engage with and seek for solutions, caught up in the problem solving process.

**Problem Solving**

Inquiry based learning is centred around a problem or a tension that requires the children to carry out research and to come up with a solution or answer to. Inquiry is meaningful for the children and thus lends itself to active student engagement where children are involved in problem solving and in turn deep thinking. Children do not “develop the ability to analyse, think critically, write and speak effectively or solve complex problems from working on more constrained tasks that emphasise memorisation” (Barron & Darling-Hammond, 2010, p. 200). On the contrary, they gain these skills when teachers provide opportunities for children to solve real life problems from being immersed in an inquiry, where the children themselves find answers to their own questions. In international research, Barron and Darling-Hammond (2010), note “that students learn more deeply when they can apply classroom gathered knowledge to real world problems: inquiry based approaches are
important ways to nurture communication, collaboration, creativity and deep thinking” (p. 199). These inquiry traits join to develop numerous skills.

Within the inquiry process, there can be varying types of inquiry (guided or open), which is heavily linked to the child’s ability to problem solve. Within a guided inquiry the teachers are the problem poser. As children become familiar with acquiring an inquiry stance to learning one has developed the skills to engage with an open inquiry where children are empowered “to make individual and unique sense of their world” (Boxley, Clarke, Witt & Dewey, 2014, p.76). As children’s problem solving skills improve, they become more aware in the identification of a problem. Inquiry formed the foundation for the children to develop from problem posers to problem solvers, providing students with an even richer skill set in problem solving. In the words of Short (2009) “we do not want students to become problem solvers who only pursue the questions that others pose for them and do not question the question” (p. 16). Children need to be able to identify what fascinates them in the world around them and identify where there are problems in the world. Once the children identify their own problem, that requires them to solve it, the children will be much more invested in their learning and devising solutions.

This connects with the previous section on questioning skills where, depending on the questions the children and teacher poses depends on how the children engage with the problem solving process. Regardless of whether an inquiry is guided or open, the children are centred around problems and constantly developing their problem solving skills, at their own level, equipping the children with these skills for life. The child’s agency is at the frontline where the children develop choices and control over the direction of their learning journey.
Children’s Agency

The United Nations Convention on the Rights of the Child in 1989 recognises children as agents in their own lives now, not just as adults or future citizens. Article 12 requires that children have the right to a say in matters that affect him or her and to have those views taken into account in line with the child’s age and maturity (Children’s Rights Alliance, 2010). As a result of this “there is a growing acceptance that incorporating children’s views into decision making results in better data and outcomes for children and for the societies in which they live” (The Heritage Council, 2016, p. 2). Children are now being recognised as citizens in their own right and capable of making changes within their communities, however big or small.

Internationally there is a call for children to anchor their agency to take action. In the context of the United States of America, Winograd (2016) notes that now is the time for moving from informing children about what is happening in the world, to teaching them in a way that they have the skills to take action. Having the knowledge about what is happening is not enough, “moving forward from teaching about these issues in science class toward pedagogies of relevant action” (Benavides, 2016, p. 146). Through inquiry the children move through the process of establishing a problem, researching it, to finding a solution and taking action in order to provide a better world for future inhabitants.

Similarly in a UK context, future inhabitants are at the fore when it comes to decision making where Percy-Smith & Burns (2013) justify “there is sufficient evidence that acknowledges the potential of children and young people as actors of change” (p. 324). To begin with they have commenced by focusing on giving young people a say in decision making. The Sustainable Schools Strategy (DCSF, 2006) in England have set themselves a
goal, where by 2020, that schools will become models of sustainability, handing over control of decision making to children and the recognition from the nation of their agency.

Ireland also recognises the importance of the voice of the child, their agency and taking action on matters that affect them. Ireland is the first country in Europe to develop a National Strategy on Children and Young People’s Participation in Decision-Making (Department of Children and Youth Affairs, 2015). Children are not “beings in becoming” but are “citizens in today” and therefore have the ability to be agents of change (Department of Children and Youth Affairs, 2015, p. V). However, how children’s agency is developed has not been explored in great detail within an Irish primary school context. Inquiry based learning is one way that develops children’s agency and is the key to putting the concepts in this National Strategy into place. Value is now being placed on children’s agency within this country and it is important that the child guides the learning process, as they do in inquiry.

It is also acknowledged that adults have a key role to play in acknowledging and developing children’s agency. Percy-Smith & Burns (2013) break down that adults are “resources for providing support and facilitation and as co-learners” (p. 336). How one engages and teaches a child to enable them to become agents of change is vital, the ability to engage students in acting with agency is an “issue of methodology” (Pole, Mizen & Bolton, 1999, p. 39). When children see the value in resolving a problem and when it is connected to their life, they will put their energy into taking action and doing their bit to solve whatever problem it may be. Echoed in a study in the United States of America, Malone (2012) established that “positioning children as active change agents, led to young people recognising their sense of connectedness and stewardship for the local environment and inevitably their sense of responsibility to the planet” (p. 391). When a child witnesses that they can make a
difference, they are invested in making sure this difference is as successful as it can be and strives for their opinion and voice to be heard.

**Taking Action to become Agents of Change**

As explained in the earlier stage of this chapter, one way of teaching inquiry is through an inquiry cycle. In some of the inquiry cycles, action is one of these stages, as Short (2009) justifies “any research needs to address the *so what* question of the kind of action that is now possible, given the investigation” (p. 24). What is the point in children acquiring this new information if they are not going to do anything with it? This new information needs to be used for something in the child’s own life (that they have a connection with) and it is up to them how they use it (agency), enabling the child to use this new found knowledge to improve their life or the world around them (action).

Children are learning for a purpose and doing something with their learning where Short (2009) explains “inquiry transforms education from learning about to learning to be – to the process of becoming” (p.25). Children have the ability to change anything when they have the knowledge and skills taught to them, which is encompassed in inquiry based learning. Depending on the child and the age of the child, the action that they decide to pursue will vary. The children will decide what action they will take that “makes something happen that was not there”, to make a change in their life (Dunne, 2016, p. 14). Children are inspired to take action when they feel it will make their life better and they have the ability to do so. Through inquiry possibilities open up for the children, to envisage that they can be agents of change and transform their world around them to be a better place for all to live in as citizens on the earth. In an American study, Smith (2012) found that children took action and made meaningful
contributions to their communities, which made them safer for all, when they were able to see themselves as active agents. An inquiry cycle sets itself up so that children can see themselves making a difference and that it is not just the adult in the room that can be an active agent of change. This study has the ability to be replicated within an Irish context.

Inquiry sets the scene for the “goal of education”, in the words of Winograd (2016) to teach students to raise real-world questions and problems and then, to take action with others to build a more just and sustainable world” (p. 6). An inquiry begins with a question or multiple questions for the children to find an answer to. Moving to the end of an inquiry cycle, the stage of action is present where in turn the children are provided with the opportunity to take action with this new found knowledge, however they desire. Inquiry based learning meets this goal for education, the children are becoming agents of change, to make the world more sustainable. Teaching through inquiry moulds a child’s thinking about how they view the world around them. It influences a child’s life, as they are given the tools to accomplish. Short (2009) states “how we teach influences students as much or more than what we teach” (p. 11). Inquiry guides a child to question what happens around them, make their own decisions and changes, where learning and in turn action becomes a natural part of their life which pushes the child to be the best citizen that they can be.

Citizenship

Citizenship entangled with education is not a new phenomenon, and dates back to the work of Plato and Rousseau in our history of education. However both failed to create an education that develops a good citizen, where “Plato abolished childhood for the sake of citizenship and while Rousseau abolished citizenship for the sake of childhood” (Dunne, 2006,
p. 6). In today’s modern world an education that entangles citizenship in education is sought after. Dunne (2006) recognises that “one very promising way of envisaging this needed reconstruction is precisely by thinking of children and citizenship together” (p. 13), which comes together through inquiry. In looking at citizenship and education together, Dunne (2006) explains what is “available to children is crucially important: that they can ask questions, volunteer opinions, entertain conjectures, interject a comment, seek clarification, amplify or challenge what others have said, give the conversation a fresh twist, or bring it back on course” (p.13), all of which are common themes within an inquiry based learning approach.

Citizenship and developing children as change agents are knitted together. In order for a child to make a change in the world around them, good citizen skills are required from within. Winograd (2016) notes that our definition of an effective citizen is at the fore in shaping how and what is taught. Teaching through inquiry can equip children with the necessary knowledge and skills to enable them to be the best citizen that they can be. Short (2009) explains this as “inquiry as a stance brings together these perspectives to argue that we have a responsibility to help students become good citizens and good human beings – to develop wisdom as well as knowledge” (p.25). Through inquiry the children are given the opportunity to gain knowledge around a phenomenon as well as the opportunity to develop as a good citizen and to make a change to something within their life, from taking action themselves.

The United States of America have recognised that “schools have a vital role to play in preparing young people to take their place as informed, engaged and empowered citizens who will be pivotal in shaping the future of our communities” (Ministry of Education, 2007, p.1). Perhaps, this is the reason a lot of the research in inquiry based learning available is in America.
Inquiry is most successful when connections are constructed at a local level at first, which can be built upon, as the children develop their inquiry skills and see how they truly can take action to make a difference around them. Pike (2015) recognises that “the role of citizenship is wide ranging and includes local, national and global dimensions” (Pike, 2015, p. 116). When teaching through inquiry the children are guided to look at the world around them at a local level at first as the children require having a connection, with a local issue, that is directly affecting them. If the children are guided to look at a global problem without looking at it locally at first, the children do not have that connectedness to the place and the issue, in turn one’s ability to empower children to become agents of change diminishes. Without this connection at a local level Smith (2007) recognises “there is little chance that the forms of care essential to environment and social stewardship will emerge” (p. 192). In order to enable agents of change in children globally, the skills need to be built upon by dealing with what is affecting them locally and then transferred to a global scale. Citizenship does not present itself alone in an inquiry, many skills intertwine to facilitate the children to think critically about whatever phenomenon they are investigating.

**Critical Thinking**

The way children think when they are engaged within an inquiry is through exploration, applying knowledge to real world problems. Barron & Darling-Hammond (2010) identify that “inquiry and design based approaches are an important way to nurture communication, collaboration, creativity and deep thinking” (p. 215). Thinking critically does not happen alone but goes hand in hand with the other inquiry traits of communication and collaboration. A community of inquirers, including child and teacher enable one to think critically about a phenomenon to gain an insight into it. Within a science study with second
grade students in the United States of America, Gunckel (2010) recognised that the children within this study created their own explanations about sound, from experimenting with it. It was not about learning for memorisation, but learning through the experience that was meaningful. Through precise questioning and guidance, the children were enabled to think critically about sound. Learning through meaningful experience and the ability to think critically develop together. This creates a lasting memorable experience. This requirement of learning being memorable is also noted in the work of Short (2009) where she experienced the opposite in school, where learning was based on memorisation of facts, regardless of whether she understood the material or not. Once the test was over, so too was the material that she memorised. The result from this was traumatic, where Short (2009) recognised that she “ended up with superficial knowledge and no desire to keep learning about a topic – an indication that these experiences were not educative” (p. 11). Inquiry is in contrast to Short’s educational experience where a teacher aspires to guide his or her students to further their own learning in a memorable experience to provoke critical thinking.

Inquiry and the Primary School Curriculum

Although the words inquiry based learning are not mentioned in the 1999 Primary School Curriculum, the traits of inquiry are knitted right through it, as it is only in recent years that this approach to teaching and learning has been given a name – Inquiry Based Learning. An inquiry is led from the child, taking into account their interests and needs to enable the child to grow, as much as possible in an inquiry unit, whether it be with their problem solving skills, thinking or topical knowledge. This is in line with the Primary School Curriculum where it “celebrates the uniqueness of the child, as it is expressed in each child’s personality,
intelligence and potential for development” (National Council for Curriculum and Assessment, 1999, p. 6).

The National Council for Curriculum and Assessment (NCCA) are given the task of redeveloping the Primary School Curriculum, where they see fit, in order to ensure that the Irish education system is keeping up to date with our rapidly changing society. In order for the NCCA to do this, they asked Louis Volante (2018) to conduct a research review on the Effective Pedagogies for a Redeveloped Primary School Curriculum. He found that to “enable 21st century learning such as creativity, critical thinking, problem solving, collaboration and digital literacy to take place… is widely supported by the available literature and intersects with core values and philosophies that characterise the Irish context such as democracy, equity, inclusion, child agency and active participation” (Volante, 2018, p. 1). Without saying the words inquiry, Volante describes inquiry for all. Inquiry based learning is rooted in the children’s creativity, critical thinking, problem solving and collaboration. Inquiry is the root for these skills to grow. Not only is inquiry a pedagogy for fostering teaching and learning within the class, but parallel with that, it meets the needs of the curriculum.

Conclusion

The literature has highlighted the development and value of an inquiry based stance to teaching and learning. This is not a new phenomenon. Inquiry and the traits of inquiry appear to be present in the literature and research when the aim is to develop in children the skills of collaboration, problem solving, critical thinking, developing their agency as well as enabling them to become agents of change. Since inquiry based learning is the skeleton underlying
most aspects of the curriculum, it is inevitable that the researcher is left with questions. These questions include:

- How does teaching through inquiry enable the students to problem solve?
- How does teaching through inquiry enable students to act with agency?

There is very little first-hand empirical research available, within an Irish Primary School context around inquiry based learning and the skills that children develop through the engagement with an inquiry cycle. The researcher planned to test out what the research illustrates in other countries, within her own class, in an Irish context and poses the question “What are the skills and dispositions that develop during a unit of work in Inquiry Based Learning?” The following chapter describes and explains the methodological approach and research methods that were used to answer these research questions.
Chapter 3: Methodology

Introduction

This chapter describes and explains the methodology used in order to identify the learning skills and dispositions that develop during a unit of work in inquiry based learning. The chapter begins with the identification of the research questions and the rationale behind the research project. The research design is explained with the reasons underpinning why a case study approach was taken. The children are the centre of this research therefore research sample and participants pertaining to the case study are also discussed. Validity and reliability are at the fore of this case study, thus the reader can be confident in the findings of the study. Data collection and analysis will follow, concluding with the researcher explaining the reflexivity, limitations and ethics central to this study.

Statement of the Problem

In recent years inquiry based learning has come under the spotlight as a new approach to teaching. One may ask as to what the child gains from learning through this approach. However much of the educational research that was available to the researcher at the time of this research study, involved very little Irish based research in inquiry based learning. Yates (2004) argues that much of the educational research that is available “is irrelevant, too academic, poor quality, jargon ridden. It is not producing new knowledge that speaks to teachers or instructors” (p. 20). The researcher sought to change this and will seek to make this piece of research readily available to all.

The motivation and justification for this research is situated in the lack of literature in an Irish based context in this field, coupled with the researcher’s desire to establish what the
child learns from embarking on an inquiry based approach to learning. Therefore the researcher strives to answer the main research question:

- What are the skills and dispositions that are developed as students and teacher adopt an inquiry stance to learning in a mainstream primary school classroom?

After reviewing the literature the researcher identified two further questions, which stem from the main research question as follows:

- How does teaching through inquiry enable the students to problem solve?
- How does teaching through inquiry enable students to act with agency?

### Research Methodology: Philosophical Paradigms

Research is conducted when a person wants to find out information, to come to new realisations and has the data to prove that these new realisations are valid and reliable. How a person gathers their data depends on what methodology they use. Within research, qualitative and quantitative are the two forms often used. To put it simply, “qualitative research tends to be associated with words as the unit of analysis” whereas “quantitative research tends to be associated with numbers as the unit of analysis” as the biggest difference between the two (Denscombe, 1998, p.232). As well as that, a researcher can engage in mixed methods research, which encompasses a researcher incorporating a variety of research instruments that can be both qualitative and quantitative.

The researcher decided on a qualitative approach to collecting data, where the researcher interpreted the data collected and drew conclusions to determine the skills and dispositions that developed during a unit of work in inquiry based learning. Table 2 explains
that a qualitative approach is from the researcher’s perspective and another researcher could draw different conclusions from this. Adopting a qualitative research paradigm recognises that the findings within the research come from one perspective and that there can be many different perspectives and multiple versions of reality (Clarke & Braun, 2013).

Table 2

**Qualitative vs. Quantitative methods of research**

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis generating</td>
<td>Hypothesis testing</td>
</tr>
<tr>
<td>Explanatory/contextual</td>
<td>Predictive/contextually void</td>
</tr>
<tr>
<td>Holistic</td>
<td>Specific</td>
</tr>
<tr>
<td>Subjective</td>
<td>Objective</td>
</tr>
<tr>
<td>Has researcher bias</td>
<td>Amenable to statistical analyses</td>
</tr>
<tr>
<td>Is from participant's perspective</td>
<td>Probabilistic samples</td>
</tr>
<tr>
<td>Non-quantifiable</td>
<td>Generalizable</td>
</tr>
<tr>
<td>Non-probabilistic samples</td>
<td></td>
</tr>
<tr>
<td>Case-specific</td>
<td></td>
</tr>
</tbody>
</table>

(Source: Guest, MacQueen & Namey, 2014, p. 189)

Within this research study a particular paradigm was followed. Cohen, Manion and Morrison (2004) explain that “a paradigm is a way of looking at or researching phenomena, a world view, a view of what counts as accepted or correct scientific knowledge” (p. 5). Within this study the researcher interpreted the social reality through the lens of a subjectivist paradigm, where she interpreted the reality through the presentation of multi modes of data. Zuboff (1988) believes that “behind every method lies a belief” and the belief that the researcher holds is central to their research (p. 423). From the subjectivist point of view the researcher is interpreting the research through her own lens (Cohen, Mannion & Morrison,
As mentioned above, this is subject to review and another researcher may analyse a different composition from the data presented in this case.

**Research Methods and Design**

The research method one uses to conduct their research is central to their study as one's data emerges from this. The researcher identifies her rationale to the choice of research method followed by the research instruments used to collect the data.

**Action Research**

The researcher originally considered Action Research as the research method to embark on this research. Kemmis and Mc Taggart (1992) explain that action research begins with a problem or issue to research and develop a solution to, where the researcher sets out to analyse the particular part of the world they are interested in and set on a quest to change it with their participants through action. The researcher in this case is not suggesting actions to take following this research but observing, analysing and describing the case as it is unfolding. This case study begins with what the researcher is interested in, in contrast to an established issue within a piece of action research.

**Case Study**

A case study, which comes within the qualitative paradigm, was chosen as the researcher has the ability to teach a unit of inquiry and see the results from it through multiple sources within that case. Yin (2003) believes that a “case study’s unique strength is its ability to deal with a full variety of evidence” (p. 11). Within a case study the researcher has the opportunity to use a variety of research methods in order to explain and justify what they are
saying with a range of data. This case study was able to provide data that illustrated the skills and dispositions that children learned through inquiry. Yin (2003) encompasses the idea that through using the case study method one is able to explain and evaluate the presumed causal links in an intervention of inquiry based learning, something that would not have been possible through other research instruments.

Through teaching a unit of inquiry as a case study and explaining the skills and dispositions that the children gain, benefits the reader, as they are able to understand it through the example of the case. They can then in turn take this and alter it to how it would fit in their classroom, in order to make teaching and learning better. It is central to the researcher that teaching and learning can improve as a result of sharing this research with others, hence why the researcher opted for using a case study method.

**Research Instruments**

One of the advantages of using a case study method was that the researcher could use a range of research instruments to support the findings. After deciding that a case study approach would identify what skills and dispositions are developed during a unit of work in inquiry based learning, the researcher’s next objective was to decide what research instruments would show the skills that the children developed. The literature indicated that making the decision as to what instruments to use is paramount within the research in order to give an in depth account of the skills and dispositions that the children gain (Denscombe, 1998). Some of the research instruments the researcher used within this case study are explained in this section.

*Children’s work samples.* The researcher acknowledged that the children’s own work would best illustrate what they have learned. Using the children’s work samples enabled the
researcher to collect the data in a child friendly manner. Denscombe (1998) advises that documents, such as children’s work can be viewed as a source of data in their own right, something other to look at than questionnaires and interviews. It made clear to the researcher that the children’s work would be used as documentary data and to have teacher observation as a triangulation of data to endorse the findings of the research and increase reliability.

Following this, the researcher decided precisely what piece of work from the children would illustrate the skills that are being developed through the unit of inquiry. “Traditional closed ended methods of assessment such as multiple choice tests, do not adequately measure student learning in open ended inquiry learning environments” (Stoddart, Abrams, Gasper & Canaday, 2000, p. 1224). Concept maps are the complete opposite to this and would enable the children to represent their understandings with as much or as little information as they so wish. Within the unit of inquiry the children engaged with their concept maps twice, at the beginning of the inquiry as well as in the middle of the inquiry. The children were able to add their new understandings to their concept map through the inquiry, which enabled the researcher to see metacognition progression. The children used different colours of pens to clearly show how their understandings were being built upon. The researcher also wanted the children to have the freedom to log their own learning. This kept the concepts of inquiry to the fore in data collection, where the children had their own learning log.

**Teacher Observation.** Teacher observation was key during this research as it “draws on the direct evidence of the eye to witness events first hand” (Denscombe, 1998, p. 192). This instrument highlighted to the researcher what skills the children were developing, from an insider’s view on learning. The researcher had the opportunity to observe the children in their natural learning environment throughout the inquiry unit and take notes on the children throughout the inquiry. Observing the children at two different stages in the inquiry illustrated
the development of skills. When observing the children the researcher had both oral and visual data (Cohen, Manion & Morrison, 2004) which added to the richness and reliability of the data.

**Researcher Notes.** The researcher’s own notes were collected throughout the case study, at each stage of the cycle. Researcher notes were recorded as soon as possible after the observations so that the information recorded was as accurately presented as possible (Cohen, Manion & Morrison, 2004). These illustrated the insider researcher’s remarks throughout the study. Jarvis (2001) made the point that researcher notes create meaning of a lived experience. Researcher notes are crucial to create the full picture within a case study. As case studies establish the “cause and effect” (Cohen, Manion & Morrison, 2004, p. 181), the reasonings which can be recorded in the researchers own notes need to be heard to understand both the cause and effect.

**Validity and Reliability**

The idea of validity and reliability is multilayered. As a result there are many ways to ensure validity and reliability, depending upon the research design and method. One must ensure that validity and reliability are at the core of all research projects as “if a piece of research is invalid then it is worthless” (Cohen, Manion & Morrison, 2004, p. 105). Within this case the researcher recognised that validity must be maximised, therefore the reader can be provided confidence in this piece of research and its results. The researcher explored four kinds of validity namely; concurrent, catalytic, internal and external validity. These are summarised in the second column in Table 3. The steps taken in this study to ensure validity are explained in the third column.
Table 3

Validity Table

<table>
<thead>
<tr>
<th>Type of Validity</th>
<th>Summary</th>
<th>Evidence in this research study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent Validity</td>
<td>Concurrent validity ensures truth prevails as “the data gathered from using one instrument must correlate highly with data gathered from using another instrument” (Cohen, Manion &amp; Morrison, 2004, p. 112).</td>
<td>The researcher ensured her findings from her data were illustrated in another piece of data.</td>
</tr>
<tr>
<td>Catalytic Validity</td>
<td>Catalytic validity exists when a researcher helps “participants to understand their worlds in order to transform them” (Cohen, Manion &amp; Morrison, 2004, p111).</td>
<td>The researcher sought to promote agency and freedom in the child’s own learning by guiding the learning from what interests the child and in turn the children were given the opportunity to take action within this study.</td>
</tr>
<tr>
<td>Internal Validity</td>
<td>Ensuring for internal validity, ensures that the findings from the case are sustained from the data collected (Cohen, Manion &amp; Morrison, 2004).</td>
<td>The researcher sought to ensure the findings were accurate throughout the analysis through data triangulation from a number of data sources. This illuminated the researcher’s bias and their opinion.</td>
</tr>
<tr>
<td>External Validity</td>
<td>Cohen, Manion &amp; Morrison, (2004) explain that external validity exists where one must identify if the results from this case can be generalised and applied to another case or another population pocket.</td>
<td>All case studies are different, depending upon their geographical location and their social class. Within this study the researcher has given a clear description of the study from the methodology to the results and it is up to the reader to decide whether this study could be replicated.</td>
</tr>
</tbody>
</table>

Research Sample and Participants

The researcher chose to embark on this case study with her own primary school class of 18 third class students who were readily available, where the researcher had easy access to. The researcher wanted to identify with these children the skills and dispositions that are developed during a unit of work in inquiry based learning.
The 18 third class student participants between the ages of 8 and almost 10 are full of life, who love attending school daily and are eager to learn. When divided into groups within the research study the children were put into groups of two’s or three’s, depending on the questions and wonderings they had about the world around them. The teacher tried to group those with similar questions together, while maintaining a gender balance.

The school where the children attend is under the patronage of the Catholic Bishop and located in an urban area with around 240 boys and girls in attendance from junior infants to sixth class. The school aims to promote a caring and respectful atmosphere for all to learn in, regardless of differences. The children are the centre of the school in decision making, where their voices and opinions are heard through the student council as well as being the centre of this research project.

**Data Collection and Analysis**

The data collected within a research study provides a researcher with their material for analysis. Table 4 illustrates what data was collected throughout this study. Codes were created for each data set and the codes are presented in Table 4 as well.
Table 4

*Data Table*

<table>
<thead>
<tr>
<th>Data Set and Code</th>
<th>Summary</th>
<th>Sample of data set</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concept Maps (CM)</strong></td>
<td>The children explained what the environment means to them at the beginning of the inquiry cycle at stage 1 (completed in red pen). This same activity was repeated at stage 6 to identify if the children had developed their thinking about what the environment means to them (completed in black pen).</td>
<td>![Image of Concept Map]</td>
</tr>
<tr>
<td><strong>Photographs (PH)</strong></td>
<td>The children took photographs of what annoys, fascinates or something that grabs their attention on their environment walk at stage 2 of the cycle.</td>
<td>![Image of Photographs]</td>
</tr>
<tr>
<td><strong>Learning Logs (LL)</strong></td>
<td>The children engaged in a “See, Think, Wonder” activity based on their photographs from stage 2 of the cycle in their learning log copy, where they recorded what they could see in the photo, what they thought was happening and some questions that they now have (things the wonder). The children also recorded any new learning that they wished in their learning log.</td>
<td>![Image of Learning Logs]</td>
</tr>
<tr>
<td><strong>Group Posters (GP)</strong></td>
<td>The children created posters in groups of 2/3 illustrating what was of interest to them during their investigation (stage 4).</td>
<td>![Image of Group Posters]</td>
</tr>
<tr>
<td><strong>Teacher Observations (TO)</strong></td>
<td>The teacher focused on 4/5 children daily and recorded notes on their learning development throughout the inquiry. She focused on the children’s questioning, metacognition, collaboration and agency. Snippet from teacher observation notes; Ben asks multiple questions in his group. Ben: “What is going to happen next?” “Where did it all come from?” “What about all of this water?” “Is it going to get worse?” “Is it like this in all of the parks?! “What will happen the park?”</td>
<td>![Image of Teacher Observation Notes]</td>
</tr>
<tr>
<td><strong>Researcher Notes (RN)</strong></td>
<td>After every inquiry lesson the researcher recorded what she had learned or noticed throughout the lesson. Snippet from researcher’s notes; Lots of questions from the class about what the environment is, not comfortable writing what it means to them.</td>
<td>![Image of Researcher Notes]</td>
</tr>
</tbody>
</table>
For analysing the data the researcher followed the “Six Phases of Thematic Analysis” (Clarke & Braun, 2006, p. 87). These six phases are familiarisation with the data, coding, searching for themes, reviewing themes, naming themes and producing findings. These phases are summarised in Table 5. This process was not linear but began with the researcher immersing herself in the data to become familiar with all silos of data. Depending on the data type resulted in which phase to proceed to next (Appendix B). Phase two of coding the data was paramount for the researcher to break down the data for categorisation and analysis (Denscombe, 1998). Codes and code descriptors were created and used for coding the data. These are listed in Appendix C, as well as a sample of the children’s work with the codes inserted. From this, the researcher identified the themes emerging from the data. The researcher analysed each data source separately before the recognition of similar themes between the data sources. The researcher reverted back and forth through these six stages resulting in the key findings of the data. The last phase of producing findings included the researcher corresponding to the literature to identify if there were similar results.
Table 5

Six Phases of Thematic Analysis

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarizing yourself with your data:</td>
<td>Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.</td>
</tr>
<tr>
<td>2. Generating initial codes:</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.</td>
</tr>
<tr>
<td>3. Searching for themes:</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>4. Reviewing themes:</td>
<td>Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.</td>
</tr>
<tr>
<td>5. Defining and naming themes:</td>
<td>Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.</td>
</tr>
<tr>
<td>6. Producing the report:</td>
<td>The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.</td>
</tr>
</tbody>
</table>

(Source: Braun & Clarke, 2006, p. 87)

Reflexivity

Within this case study the researcher adopted the dual duty of researcher, as well as her current role as the teacher to her third class students. It made sense, that the teacher became the researcher as well, as the teacher is the person in the classroom teaching daily and therefore is able to see how these children learn best. Kincheloe (2003) calls for teachers to become researchers in order to achieve an educational system centred around quality. The roles and stance of both need to be clear, as the teacher is now taking on a new role and interpreting social reality, while maintaining their current role, as teacher. This is labelled insider case study research, where the researcher is a member of the class group at the same time as collecting data on the class group. This insider case study research fits with an EMIC perspective of an “insider’s view of reality” as opposed to an ETIC perspective, viewed as an “external social scientific perspective on reality” (Fetterman, 2012, p. 249), where it is
arguable that the true version and understanding of reality cannot be presented from an external point of view.

Having the unique position of insider researcher within this case study has allowed the researcher to critically reflect on current practice and share the results of how to improve teaching through inquiry based learning. Burke & Kirton (2006) state that “reflexive approaches help to develop teachers’ understanding of pedagogical practices and relations at a deeper level” (p. 1). The researcher witnessed first-hand how valuable insider research is and how she is able to draw findings and conclusions from an EMIC perspective to improve teaching that would not be possible as an ETIC researcher.

The researcher has an interest in inquiry based learning and is committed to the promotion of a child learning from their current stance. The researcher believes that reality is socially constructed, therefore this case study is interpretive. The acknowledgement of the participants being known to the researcher as well as the experiences and beliefs of the researcher are central to this study in which emerges a reflexive position accepted by the researcher.

However, there may be bias from the insider researcher when gathering data as the children are known to them. Awareness is one of the most important aspects in order to overcome this. Unluer (2012) reiterates this stating that one “must constitute an explicit awareness of the possible effects of perceived bias on data collection and analysis” (Unluer, 2012, p.12). Therefore within this case study the researcher made herself aware of this and made sure that she had a plan to follow, stating exactly what skills she would be looking out for in the children at each of the data collection phases (Appendix D). The researcher ensured
that none of the skills or dispositions that the children developed through the inquiry went unnoticed. This constitutes to reliable insider research.

The researcher acknowledges that since she is in the research that her values may shape the interpretation of the data. The researcher kept a reflective diary throughout this inquiry journey which states exactly what was involved on a daily basis. The researcher collected and interpreted data without prejudice as far as she could. Critical conversations with the research supervisor were also paramount in not allowing the researcher’s values shape the interpretation of the data. As the researcher is a novice researcher she recognises that this is a difficult task to do as her awareness of bias as a researcher and research skills are constantly developing. A data collection plan and structure were extremely important to keep the researcher’s view from an impartial perspective and away from her values. The systematic data collection plan, together with the researcher journal brought rigour to the research process and added to the trustworthiness of the findings.

Ethics

Ethical approval was sought for this research from the Marino Institute of Education Ethics committee. As this is a case study with children this increases the ethical considerations. Any study involving children is considered high risk research. The children’s safety, confidentiality and anonymity remained at the fore throughout. At the outset, the researcher met with the school principal and outlined the proposed research. Following this, the researcher sent a letter to the school’s BOM, outlining the proposed research and seeking permission to embark on this research project with the children in her class (Appendix E). The researcher wrote to each of the parent’s/guardians of the potential participants informing them
of the study and the data that would be collected if their child was to take part (Appendix F). There was a consent form attached to this letter for them to sign if they would like their child to be part of the study. The researcher also explained that if they did not want their child to take part that the child would be part of the lessons but data would not be collected on them. Following gaining parental permission the researcher invited the students in her class to take part within the study and explained to them what this would entail through a class discussion and consent form (Appendix G). As the researcher is in a position of authority through the relationship of teacher and pupil, she ensured to explain to the children that they were under no obligation to take part and that it was only if they so wished.

While the researcher was conducting this research she ensured that the children’s confidentiality and anonymity was kept. During the Investigation stage of the inquiry cycle the researcher instructed the children to use the safe search engines “Kiddle” and “Kidrex”. Within the write up stage of the dissertation the researcher ensured that no names were attached to any information nor would any child be identifiable in any photograph. All names used are pseudonyms. All of the data collected is stored in a locked cabinet (hard data) or on a password protected computer (soft data). The researcher will destroy this data in due course, as per college regulations.

**Limitations**

Within all pieces of research there are limitations. The limitations within a case study are recognised by the researcher. One may overlook the findings of the case study as they are not numerically based but interpretive. The findings of a case depend on what the researcher deems to be noteworthy and not based on figures or trends. However, “case studies can
penetrate situations in ways that are not always susceptible to numerical analysis” (Cohen, Manion & Morrison, 2004, p. 181). Not all findings can be derived from numerical sources, but require one to look at the social science, with which the researcher has adhered to throughout this case. Within this case to ensure a rich quality of findings the researcher ensured they came from different data sources through triangulation. Although there is no numerical data or findings present the researcher ensured the interpretive findings were endorsed by another piece of data.

On top of that, the fact that case studies are not generalised but need to be taken in context of the case, that they are not exactly replicable, can be considered a limitation. Willis (2014) argues that this is the most prominent critique of the case study method. The researcher acknowledges this limitation and to combat this, the researcher has provided a detailed and thorough analysis of the research process to allow the reader to fully appreciate and understand the research that was undertaken. Thus they can, infer and adapt this research to their own context. “The purpose of the case study is not to represent the world but to represent the case” (Stake, 1994, p. 245). This case study and the findings are true to the situation the researcher was in and may not be generalised to the wider population.

A third limitation is the fact that it is insider case study research; it is open to researcher bias. One of the pitfalls within a case study that Stoecker (1991) recognises is that because a case study does not employ controls or does not pilot the research instruments then it opens itself up to researcher bias, which is entirely true. To reduce the possibility of this occurring the researcher ensured that she verified her findings with more than one data source through triangulation, as well as looking for other possible explanations. The researcher had a clear plan as to what data was to be collected so that she did not proceed into researcher bias mode. The researcher clearly states her positionality, that she is passionate about inquiry based
learning but had steps in place to ensure it did not cloud her judgment and alter the results of the study.

**Conclusion**

In this chapter the research methodology, design and sample were described to allow one to follow the path that the researcher undertook during this study. As well as that the validity, reliability, reflexivity and ethical considerations that were put in place were depicted. A case study is unique in the sense that the case “cannot be replicated – that is their strength rather than their weakness” as Cohen, Manion & Morrison (2004) explain (p. 119). All cases are different and the choice of research instruments depends largely on the case and sample available. The researcher has provided a comprehensive and detailed case where the data presented is multimodal and intertwined with each other to give honest results from this particular case.

The next chapter will analyse and discuss the findings of this EMIC case study illustrating the skills and dispositions that emerged and were developed during a unit of work in inquiry based learning.
Chapter 4: Findings

Introduction

Chapter 3 explained and justified the research design and methodology for this case study, to identify the skills and dispositions that developed in a unit of inquiry as part of an inquiry stance to teaching and learning. This chapter describes the inquiry taught as well as the participants’ profile and presents the main findings that emerged from this case study in four themes. Firstly, the multiple skills and dispositions that the children acquired will be examined along with the recursive nature of them. Following that the children’s developing inquiry stance will be discussed followed by the teacher’s learning that developed through engaging with this inquiry.

The findings in this chapter were generated from data gathered using qualitative methods; children’s work samples, photographs, observation and researcher’s notes. Table 6 illustrates the total data collected throughout this unit of inquiry.
Table 6

Data Collected

<table>
<thead>
<tr>
<th>Inquiry Unit Title</th>
<th>Our Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Idea</td>
<td>In interacting with natural habitats, humans make choices that have an impact on other living things</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stages of the Inquiry Cycle</td>
<td>1 &amp; 2</td>
<td>3</td>
<td>4 &amp; 5</td>
<td>4, 5 &amp; 6</td>
</tr>
<tr>
<td>Form and Number of Data Sets</td>
<td>Concept Map Phase 1 (18)</td>
<td>See, Think, Wonder Activity in Learning Log (18)</td>
<td>Learning Log Entries (18)</td>
<td>Learning Log Entries (18)</td>
</tr>
<tr>
<td></td>
<td>Photographs (138)</td>
<td>Observation Notes (5)</td>
<td>Researcher’s Notes (3)</td>
<td>Concept Map Phase 2 (18)</td>
</tr>
<tr>
<td></td>
<td>Observation Notes (13)</td>
<td>Researcher’s Notes (1)</td>
<td></td>
<td>Group Posters (6)</td>
</tr>
<tr>
<td></td>
<td>Researcher’s Notes (2)</td>
<td></td>
<td></td>
<td>Observation Notes (18)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Researcher’s Notes (3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Number of Data Sets</th>
<th>171</th>
<th>24</th>
<th>39</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Total Number of Data Sets</td>
<td>297</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Participant Profile

The participants involved in this study were from the researchers own school. This is a large school, an old building; however there are large windows where the light pours in, overlooking the park and lake in the area. About 240 students, nine mainstream class teachers and five learning support teachers attend the school. The school is located in an urban area.
with a population of around 1240 people. The socio demographic status of the area is for the majority from a working class background with typical local employment consisting of plant and machinery operatives, owing to the large factory located in the area. The people living in the area are largely white and indigenous with some influence from European countries over the last number of years.

Eighteen third class pupils were involved from the researcher’s class: nine were boys and nine were girls. All the children involved were between the ages of 8 years and almost 10 years with the average age of the pupils involved being 9.06. As a whole they are a bubbly class who are eager to work with a keen interest in sport, football in particular. As a group they get on very well together, apart from on the days that a referee is needed in the football area of the playground where a disagreement has arisen. As a class they love to engage with the story writing process and are eager for their day on the author’s chair to read their story aloud. There is a wide range of abilities within the class and a classroom culture has been created where each child strives to be the best that they can be on a daily basis. Their enthusiasm within the class is plentiful and contagious. Within this research project the researcher was given the opportunity to witness these children grow and evolve through the inquiry and establish four themes within the findings.

**Inquiry Unit**

This was the group of students who embarked on this case study, where a unit of inquiry was taught with the central idea being “in interacting with natural habitats, humans make choices that have an impact on other living things”. Appendix A, the inquiry unit plan explains each stage of the inquiry unit taught in detail. This unit of inquiry was taught in the
context of Kathy Short’s (2009) inquiry cycle. Short’s (2009) inquiry cycle is based on nine stages, starting with stage 1, Connection, where the children connect what they are going to be learning about to some aspect of their own life and their current understandings. In this case study, the teacher started this inquiry by identifying what the environment means to each child through a concept map. Each of these stages in Short’s (2009) inquiry cycle are explained in Figure 2. Stage 2, Invitation, invites the students to go beyond these current understandings, where in this case the teacher and students went for a walk around the area, taking photographs of anything that annoyed, fascinated or caught their attention. Stage 3, Tension, requires the children to try to identify issues or problems. In this inquiry, the children identified what they were able to see, think and wonder about their photograph from the previous stage of the cycle. Stages 4, 5 and 6 in this inquiry were interlinked where they involved investigating (stage 4) the problems they identified. While engaged in their investigation the teacher stopped various groups and supported their learning, depending on what each group required (stage 5, Demonstration). As well as that each group chose when to reflect on their current understandings, draw conclusions and answer their problems (stage 6, Revision). Data was gathered by the researcher for the first six stages of this unit of inquiry to inform teaching the final three stages.
Figure 2

*Stages of Kathy Short’s (2009) Inquiry Cycle Explained*

(Source: Camire, 2014)
The findings are connected with the research questions and to avoid repetition are presented thematically as consistent themes emerged throughout the data sources. Figure 3 presents the themes that emerged throughout the data analysis.

Figure 3

Themes from Data Analysis

Theme 1: An Emerging Inquiry Stance

Theme 2: Multiple Skills and Dispositions Developed within an Inquiry

Theme 3: The Recursive Nature of the Skills and Dispositions

Theme 4: Teacher Learning

Theme 1: An Emerging Inquiry Stance

The first main finding was that adopting an inquiry stance to learning did not come naturally to the children at all, at the beginning of this unit. Through the design of the inquiry at stage 1 (Connection – concept map of what the environment means to them), the teacher had given autonomy over to the children. A clear finding was that the children were not used to adopting this stance and as a result did not know what the teacher wanted them to do in the activity to get the “correct” answer. The children were double checking what the teacher wanted them to do, in asking what to write in their concept map about what the environment means to them. Figure 4 shows a snippet of the questions that the teacher recorded in her researcher’s notes. The teacher had to spend some time explaining to the children that it was
up to them and that they had control over their learning, in a child friendly manner. However, once it was established with the children that the teacher would like to see their voice and mind coming through, the children began to relax and put pen to paper to show what the environment means to them in their concept maps.

**Figure 4**

*Questions the Children Asked as Recorded in Observation Notes at Stage 1*

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Connection – Concept Map</th>
</tr>
</thead>
</table>
| Some questions asked by the children | *What exactly do you want us to write?*  
*Is the environment grass?*  
*Is the environment the park?*  
*Can I write that the environment is important?*  
*Is the environment trees?*  
*Is the environment being wrecked?*  
*Is the environment nature?*  
*Is the environment animals?*  
*Is the environment outside?*  
*Does the environment mean things all around me?* |

**Theme 2: Multiple Skills and Dispositions Developed in an Inquiry**

A second finding was that multiple skills and dispositions were developed in this inquiry, illustrated in Figure 5. Although recognising the interplay and interconnectedness of each finding, for the purposes of clarity, these are presented separately.
Problem Solving

Problem Solving was the first skill that developed gradually throughout this inquiry. The researcher found that three levels of problem solving emerged,

1. Identification of a problem but no view to solving the problem,

2. Identification of a problem and a solution for somebody else to solve the problem to

3. Identifying a problem at their own level that they have the ability to solve themselves.
At level 1 of the problem solving process, the children identified problems from the beginning of the inquiry cycle illustrating what the environment means to them at stage 1 (Connection). This is evidenced in Belle recognising the problems such as “ice bergs melting” and “saving the trees”. Irene recognises the problem of bushfires in Australia and Faith recognises that the environment needs cleaning and needs taking care of but do not offer solutions as to how these problems could be solved (Figure 6). Although problems arose at this stage, the children did not engage with trying to solve these problems.

Figure 6

Selection of Concept Maps

<table>
<thead>
<tr>
<th>Belle’s CM</th>
<th>Irene’s CM</th>
<th>Faith’s CM</th>
</tr>
</thead>
</table>

Note. Stage 1 Concept Map = red pen, Stage 4 Concept Map = black pen

The next level of problem solving that the researcher identified within this inquiry was that the children identified problems and provided a solution that other people could solve. At stage 3 (Tension) of the inquiry cycle the children were required to examine a photo that they had taken when they were on their environment walk (stage 2). They analysed it by identifying what they see, think and wonder about what is happening in the picture. In Ben’s photo the bridge in the park is flooded and people were not able to cross it. Ben’s thinking emerged to how one could solve this problem, with the solution that the bridge should be higher (Figure
The children’s ability to problem solve has moved to the next level of identifying a problem and providing a solution for others to solve.

Figure 7

Identification and Solution to a Problem; Level 2 of the Problem Solving Process

Then the final level of problem solving was that the children identified a problem and a solution that they were able to solve themselves, in their groups. At stage four (Investigation) of the inquiry cycle in Grace, Ben and Fergal’s group one of their problems was that there was a lot of plastic bottles used on a daily basis and they found the fact that “more than 480 billion plastic bottles were sold worldwide in 2016” (Fergal). Their solution to this problem was recorded in the teacher’s observation notes where Grace asked “can we go to the other classes and tell them that there are 480 billion plastic bottles sold a year and ask them to bring their drinks in reusable bottles?” Grace was using the amenities available to her to play her part at alleviating this problem.
In summary the first skill that developed within this inquiry was problem solving and it developed in three levels. The children also developed their critical thinking skills within this inquiry.

**Critical Thinking**

A second skill that was developed in this inquiry was the children’s ability to think critically about how humans make choices that have an impact on other living things. The children did not engage in critical thinking until phase 2 (stages 4, 5 and 6) of the inquiry cycle. During stage 4 of the cycle (Investigation) the researcher recognised that in one group a picture of a dolphin was on the screen and a collaborative conversation ensued around it, as recorded in teacher observation notes.

*Irene:* *The dolphins look harmed because there are scratches on them.*

*Cara:* *It is probably from the barbed wire.*

The children engaged in inferencing to draw conclusions from knowledge they already had. The children continued to read the information on the screen where it informed them that dolphins are hunted. Cara was alarmed at this, questioning why it happens, “*why do people catch dolphins because they are not used for anything?*” and the group continued to find an answer to this question. The children investigated further as to why dolphins would be hunted. The children were thinking critically about the information given along with what they already knew to derive a new understanding. The children’s thoughts were constantly changing due to the critical thinking that was evolving which resulted in the children to question further what is happening in the world around them.
Questioning Skills

Evident to the researcher during data analysis was that there were three aspects to the questioning skills within this inquiry;

1. Questions were asked throughout due to the structure of the inquiry

2. Questions ranged from lower order to higher order

3. Teacher questioning was an important feature

Firstly, questions were commonplace throughout this inquiry from both student and teacher. The structure of the inquiry through the cycle promoted the development of questions. From the environment walk at stage 2, the researcher commented (within the researcher’s notes) on the children asking lots of questions at each stage of the cycle. The majority of questions were constructed during stage 3 (Tension) when the children were asked to think of any wondering they might have based on the photo they had taken during their walk (stage 2). Figure 8 shows a sample of the different questions the children had at this stage. Questions continued throughout the cycle where the children questioned information they read during their investigation (stage 4) within their groups, as recorded in the researcher’s notes.

Secondly, questions ranged from lower order to higher order within this inquiry. For example during stage 2, Damien wondered if the flood would ruin the park (L.O.) and wondered how the fish in the water were feeling (H.O.) (Figure 8). Figure 8 shows a variety of lower order and higher order questions posed by the children in their see, think, wonder activity. Figure 8 also shows a snippet from the teacher’s observation notes of a range of lower order and higher order questions asked.
**Figure 8**

*Questions Commonplace Throughout the Data*

<table>
<thead>
<tr>
<th>See, Think, Wonder Worksheets</th>
<th>Snippet from Observation Notes</th>
<th>Snippet from Researcher’s notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>Stage 4: (Daisy) When I arrive to the group Daisy is talking about trees to Hannah “I’m not sure what trees are for but mummy says we need them in the world. I’m going to check why we need trees” “Maybe that’s why we must take care of the world.. to look after the trees” “Do we need plants in this world too” Stage 4: (Grace) When I arrive to Grace’s group I have interrupted the conversation and Grace turns to talk to me “Teacher, I’m thinking about things I never realised before, I’ve so many questions, can we add more to our see, think wonder sheet?” Stage 4: (Gary) Thinking about animals in our environment and wondering why they get killed. Investigates with his group and mentions that animals have been killed for food, for clothes and by plastic. <em>Do all animals get killed for clothes? (Gary)</em></td>
<td>The children’s voices filled the classroom as they engaged with each other in their groups. Each group is working well together and all children are being given an opportunity to speak. Questions are being asked constantly. When one question is asked, another one follows. There does not need to be an answer for them to ask another question. Group 4 may need encouragement tomorrow with locating answers.</td>
</tr>
</tbody>
</table>

Thirdly, teacher questioning was an important feature within this inquiry. At stage 5 (Demonstration), the children reviewed how they phrased their questions, as they could not locate answers to their questions while researching online. The researcher was able to witness the children building on their questioning skills and seeing other ways that questions could be
asked. Irene had lots of questions that she wanted answers to (Figure 9). Recorded in teacher observation notes was that one question Irene was researching was “what is under the water?” Irene was having difficulty finding an answer so through the teacher questioning Irene about this she altered her question a number of times to finish on “what is found in a lake?” The teacher’s role was very important in enabling the children to develop their questioning skills and define more clearly what they are seeking in a question.

**Figure 9**

*Irene’s See, Think, Wonder Worksheet*

The observation and researcher’s notes combined provided the researcher with an insightful picture as to how the children worked together. It was evident that the children had
formed a community of inquirers within each group. The children wanted to learn from one another and the recognition that when they work together they can create wonders. Table 7 shows an extract from the researcher’s notes stating how each group started working together during stage 6 (Revision) after the teacher explained what this stage entailed. Recorded in the researcher’s notes (from stage 4) is that the children worked extremely well together. Each group worked differently and on different aspects of the environment, but had comparable outcomes. The group work and social skills that the children developed within the inquiry were evident. They did not need roles given to them at this stage. The teacher noted the following conversation in her notes while walking around the classroom, this represented the kind of conversation that happened in each group:

Grace: *Can I do this?* (while pointing to the colouring of the bubble writing)

Ben: *Yea, and I’ll do this* (a drawing of a bin).

Each group worked together, taking turns and listening to each person’s responses to come to an agreement. They recognised the strengths that individuals had in each group and wanted others strengths to shine in their learning. For example, the teacher also recorded in her researcher’s notes that Damien asks Aoife in their group “*will you do all the drawing for our poster because your drawings are brilliant*”. It is evident that the children are developing as citizens that care for one another as well as the world we live in.
Table 7

*Each Groups Starting Point for Revision Stage of the Inquiry Cycle*

<table>
<thead>
<tr>
<th>Group</th>
<th>How they began when set the task to prepare for group work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group conversation about what each person would like to do in their group, when this was clear, divided into three jobs, one to illustrate, one to deliver the positive attributes and one to deliver the negative attributes.</td>
</tr>
<tr>
<td>2</td>
<td>Decided to start with a concept map to show all the things they learned and from that have sections to discuss.</td>
</tr>
<tr>
<td>3</td>
<td>Conversation on what information to start with, each person took their favourite and decided how to present that information.</td>
</tr>
<tr>
<td>4</td>
<td>Decided on a poster and started straight away, no discussion before, just while they were working.</td>
</tr>
<tr>
<td>5</td>
<td>Divided up jobs</td>
</tr>
<tr>
<td>6</td>
<td>Group conversation about what each of them wanted to do.</td>
</tr>
<tr>
<td>7</td>
<td>Divided themselves into writing and drawing jobs.</td>
</tr>
</tbody>
</table>

*Agency*

The data illustrated to the researcher that once the children made a personal connection with their learning, their agency flourished and they took control of their learning. However, the role of the teacher was paramount in agency developing where recorded in the researchers notes (Figure 10) is that at stage 1 (Connection) where the children were writing what the environment means to them in a concept map that they wanted instructions on what to write. The teacher did not provide this instead she repeatedly informed the children that all answers are valuable and made no judgements about what any child wrote. It was acknowledged that all the children’s answers were equally correct.
Figure 10

Researcher’s Notes

<table>
<thead>
<tr>
<th>Snippet from the researcher’s notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1: Connection</strong></td>
</tr>
<tr>
<td>The children were not comfortable in answering what the environment means to them, in their concept map. They wanted me to tell them the answers and wanted a generic answer to write down. I informed them that there was no correct answer and that all answers were valuable as it is what the environment means to them, not me. This exercise took longer than expected as it took some time for the children to accept this and I did not want to rush them. I did not make any judgement on answers given, all answers were considered equal.</td>
</tr>
</tbody>
</table>

The children made choices and decisions within this inquiry that made an impact on their learning and world around them. The power of the children’s learning was in their own hands. In turn each group created different learning moments for themselves centred around what interested them from having agency over their learning. In Cara, Faith and Belle’s group their learning was centred around the beauty around us but also that people have destroyed some of this beauty and together presented it in the form of a large piece of artwork (Figure 11). Whereas in Irene and Eddie’s group they were particularly interested in water in our environment and presented a poster based on the theme of oceans and floods (Figure 11).

When a child has this agency over their learning they have the ability to control whether they take action and make changes or not to the world around them.
Figure 11

Different Creations by the Children when they had Control of their Learning (Agency)

<table>
<thead>
<tr>
<th>Cara, Faith and Belle’s artwork based on the beauty around us coupled with the destruction of this beauty</th>
<th>Irene and Eddie’s poster based on the theme of oceans and floods</th>
</tr>
</thead>
</table>

Ability to become an agent of change

The children within this study developed their citizenship in tandem with their developing sense of agency. The data from the study shows that in order for children to become agents of change they need to view themselves as having this ability to make changes, which grew from the children’s developing citizenship and agency together. This belief in their ability to become agents of change grew as the inquiry progressed. At the start of the inquiry the children’s view was that other people within the world owned this responsibility of change. This was evident in the questions that the children generated in the early stages of the inquiry cycle. For example, Faith asked “will anyone clean the path, poles, signs and pick up the rubbish?” She did not recognise that she had the ability to do this and instead believed that the onus is on others (Figure 12). In comparison to during the Investigation stage where
recognisable in the observation notes that she now viewed herself as having this responsibility (Figure 12). It is clear that now Faith recognised that she can be the one that can make a change, it is not just other people.

**Figure 12**

*Faith’s Belief in her Ability to see herself as an Agent of Change*

<table>
<thead>
<tr>
<th>Faith’s See, Think, Wonder Worksheet at Stage 3 (Tension)</th>
<th>Observation Notes at Stage 4 (Investigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Worksheet Image]</td>
<td>The children are recording their information and making posters Faith asks “Can we do a litter pick up like 6th class do for the tidy towns?” Teacher replies “we will certainly have to look into organising a litter pick up. I wonder where the litter pickers were got.” Faith: “my cousin is in first year, i’ll ask her.”</td>
</tr>
</tbody>
</table>

The data suggested that during stages 1-3 of the inquiry cycle the children did not consider themselves as change agents however by stage 4, not only do children see themselves as change agents but used their agency to become an agent of change. The children strived to
make their community better. Grace took it upon her own accord to create a story showing the importance of picking up litter at stage 6, Revision (Figure 13).

**Figure 13**

*Grace’s Story Showing the Importance of Picking up Litter*

![Image of a story about picking up litter]

**Citizenship**

The structure of the inquiry whereby making a connection to the children’s own environment allowed for the identification of problems within it. From this the children questioned what was happening in the world around them and brought their concern for protecting the world around them to the surface in their learning. In the children’s concept maps, created at stage 1 (Connection) and again at stage 4 (Investigation) they identified what the environment meant to them.
An example of this development of citizenship is provided by Gary’s work. At stage 1 he recognised that the environment is “important” to him and that “we need to take care of it”. However by stage 4 of the cycle Gary’s sense of citizenship is further developed as he recognised now how he can play a part, he can “take care of the environment” by “keeping it clean, not littering, more people need to carpool, doing less driving and more walking”. See Figure 14 for Gary’s Concept Map. This theme was evident throughout when comparing and contrasting the concept maps. In Damien’s, he recognised at stage 1 that he needed to “care for the environment” and “keep the world clean”. Then by stage 4 he knew that he could do this by “not throwing gum out of your car, stop using plastic bags and plastic straws” and instead “use paper straws”. The children did not just grow as learners but as citizens within their community, by recognising how they can personally help to care for the environment around them.
Through engaging with this inquiry unit the children have developed many skills and dispositions as well as their learning which is evident in the numerous pieces of data presented. However, the researcher remarks that these skills did not develop in isolation but merged and developed together. The recognition of this established the second theme within this study.

Theme 3: Recursive Nature of Skills and Dispositions

The skills did not develop by themselves but relied on the development of another skill. For example, in relation to critical thinking and questioning skills, one impacted the
other. The researcher found that the questions that the children posed were heavily connected to their ability to think critically. Within Cara’s See, Think, Wonder sheet (Figure 15) we see how her questions such as “is the grass going to be able to grow through the water” enabled her to wonder about this and thus engage with higher order thinking skills. The teacher’s questions were also critical here where she questioned Cara on this problem. Cara clarified to the teacher about how the grass was being drowned by the flood, as it had too much water and not enough sunlight for growing. Figure 15 shows the evidence of questioning and critical thinking skills, relying on one another and developing in unison. Through critical thinking engagement Cara was drawn to the realisation that she will be able to check back on this grass to see if it will grow again after the flood is gone. This leaves Cara with more wonderings and in turn more questions are asked. Illustrating how the questions from both teacher and student were pertinent in Cara engaging with critical thinking. One skill is dependent on the other.
Figure 15

*Questioning and Critical Thinking Skills Emerging Together*

<table>
<thead>
<tr>
<th>Cara’s see, think, wonder worksheet</th>
<th>Snippet from teacher observation notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Wonder...</td>
<td>Teacher asks Cara questions on her wonderings. Cara clarifies that the grass is under all the water and therefore being drowned by the flood. “There’s too much water and not enough sunlight for growing” (Cara) (recorded in teacher observation notes). Teacher: <em>Will that water stay there forever.</em> Cara: <em>No it will go when the weather gets better.</em> Teacher: <em>Interesting, that’s great that the water will go away. I wonder will the grass ever grow again there?</em> Cara: <em>Hmm I don’t know, I can check on the way home from school every day to see when the water goes and if the grass will grow again.</em> A few minutes later Cara asks, “<em>I wonder is there more fish there now that there’s more water?</em>”</td>
</tr>
</tbody>
</table>

| IS it going too kill           | IS there lots off rul in the water. |
| IS the fish in the water.     | going too grow throo the water.     |

**Theme 4: Teacher Learning – My Journey of Inquiry**

It is imperative to recognise that it was not solely the children learning through inquiry but also the teacher. I recognised the importance of the role I played within the inquiry process. From the beginning of this inquiry I gave control to the children of their learning, which does not come naturally to me as a teacher. I normally have a clear, organised plan of objectives and learning activities that I have created and have control over. However, the importance of taking this control away was paramount to the ability of the inquiry to develop.
The children were allowed to direct their learning throughout and without this one would not witness the varied learning presented in the wonderful posters created with a range of learning messages, poetry and art work presented in them (Figure 16). These posters showed creativity and individuality on what interested them.

**Figure 16**

*Posters Created by the Children for Group Presentation*

My role as teacher was extremely important throughout this inquiry in the creation of the learning environment. I wanted to give the children control of their learning, for the children to recognise their own agency, therefore I was watching out for this. When I saw the children’s agency (at stage 2) emerge I provided the children with a learning environment created to anchor this. At stage 2 (Invitation – environment walk), the children were invited to take photos of things that annoy or fascinate them, or simply something that grabbed their
attention. I could have presented the children with photos that I had taken and that I found interesting. In fact, I would have done this in my teaching before adopting this inquiry stance. The way that I created the learning environment resulted in the children’s ability to recognise and trust their own agency over their learning. The students availed of the opportunity to take photographs that interested them personally. These photographs then formed the core of their own inquiries. Figure 17 illustrates an array of the images illustrating the various aspects of their environment that captured the children’s attention. What I learned was how significant the way in which the teacher initially presents the learning content has a subsequent effect on how the children engage with their learning from then on. The early stance adopted by a teacher sets the tone for what follows.
In the beginning stages of the inquiry cycle, I recognised that it was my role to enable children to gain personal insight into what each is individually passionate about and has an interest in. As if I did not help each child find what is of particular interest to them and connect it to their lives the learning would not be meaningful to them.
Another learning moment for my teaching was how important questions are to develop the children’s learning. The questions that I asked the children impacted on how they thought about various aspects of their investigation. For example in Figure 15 above Cara was able to develop her thinking as a direct result of the engagement she had with me from the questions that I asked. I predicted that while the children were investigating (stage 4) that I would watch as their learning evolved. However, the role of the teacher is far from that of passive observer but involves a proactive practice in guiding the children to their next learning moment. Before adopting an inquiry stance to learning my vision of questioning the children would have been to assess what the children know. In this inquiry my questions had a different role; to guide the children to a new wondering or learning moment. Therefore a finding from this case study research was how my own questioning skills within the classroom changed.

Of real significance within my learning journey was my understanding of how important the proactive and deliberate role of the teacher is within an inquiry approach to teaching and learning; from the learning structure and environment provided for the children to the particular questions we ask them within an inquiry. I learned that this begins from the moment we step inside the classroom and model how we think about the world around us. The children pick up on this and through this modelling of our (teacher) thinking throughout the inquiry, children can learn to be inquirers. As teachers, we are facilitating learning opportunities in particular ways so that students can learn how to lead their own learning and thus develop this skill to lead their learning not just for this lesson but for their entire learning lives.
Conclusion

This chapter presented the main findings of this case study to the reader justified with data gathered from the children’s work samples, photographs, teacher observation and researcher’s notes. The findings were presented thematically and demonstrate that the children developed their ability to question, reflect and problem solve while taking control over their own learning and respecting the views of others. These skills coupled with the development of the child’s already engrained role as a citizen was built upon. The researcher recognised how these skills and dispositions developed in a discursive manner, providing deep learning for both students and teacher. To situate these findings and their relevance to the research questions a discussion of these will be offered in the following chapter.
Chapter 5: Discussion

Introduction

In the previous chapter the findings of this research study were outlined thematically. An analysis of the main research findings is discussed critically within this chapter. This discussion is presented in relation to the research questions, analysing each of the skills and dispositions that the children gained from this unit of inquiry, as well as being discussed in relation to the literature from chapter 2. Following this the two sub research questions will be examined, concluding with additional findings.

Main Findings

The main findings from this study echoed for the most part the findings from the literature review. However a significant finding from the study was the need for the teacher to adopt a proactive and deliberative stance to practice, coupled with the reluctance from the children at the start of the inquiry cycle to accept the opportunity they were being given to follow their own lead. From this the importance of following each of the stages within the inquiry cycle, to allow for the children’s skill development was established.

Four themes emerged from the findings of this study; an emerging inquiry stance to learning, multiple skills and dispositions developed in engaging with an inquiry, the recursive nature of skills and disposition and teacher learning. Each research question is now discussed and analysed in detail to establish to what degree each was answered.
What are the skills and dispositions that are developed as students and teacher adopt an inquiry stance to learning in a mainstream primary school classroom?

This study found that multiple skills and dispositions were developed namely; problem solving, critical thinking, questioning, collaboration, citizenship, agency and the ability to become an agent of change.

**Problem Solving**

The researcher found that problem solving emerged as three different levels within this study; identification of a problem but no expectation about solving the problem, identification of a problem and an expectation that somebody else would solve the problem to lastly, identifying a problem at their own level together with the insight that they themselves have the ability to solve. Literature that was reviewed in chapter two states that this is linked to the structure of the inquiry as when the children become more familiar with the nature of inquiry the teacher gradually moves the children from problem posers to problem solvers. As recognised by Short, “we do not want students to become problem solvers who only pursue the questions that others pose for them and do not question the question” (Short, 2009, p. 16). The structure of the IBL cycle is designed to promote collaboration with others. Remarkable in this study is that the children achieved the highest level of problem solving; identifying a problem and a solution which they had the ability to enact, when collaborating with others in group work. It is imperative that the children followed each of the stages of the inquiry cycle in this study, so that they could move to the next level of problem solving. If they did not engage with stage 1 (Connection) they would not of been presented with the ability to connect with their environment and in turn recognise a problem within their environment. It is remarked that the teacher through the structure given by the inquiry process and in
collaboration with other children, gradually enabled the child to develop richer problem solving skills.

*Critical Thinking*

Results from the data show that the children did not engage with critical thinking until phase 2 (stage 4, 5 and 6) of the inquiry cycle. This led to a realisation that that an inquiry stance was to be established with the children first to make them familiar with the traits of inquiry, such as to question what is happening in their environment and to make a connection with it before the child can engage in thinking critically about it. This finding also supports the work of Barron and Darling-Hammond (2010) where they recognise that an inquiry approach of communication and collaboration nurtures critical thinking to evolve from it. Thinking critically does not happen alone but goes hand in hand with the other inquiry traits such as questioning, communication and collaboration to be established in their learning first.

*Questioning*

The data illustrates that the children and teacher were engaged with questions throughout this inquiry. Questions were followed by more questions. The data in chapter four illustrated as the children’s thinking developed, new questions emerged. During the investigation stage of the inquiry cycle Grace wanted to go back to a previous activity and asks the teacher, “*Teacher, I’m thinking about things I never realised before, I’ve so many questions, can we add more to our see, think wonder sheet?*” This finding is paramount in the literature where Wolk states that “questions fuel the inquiry” (Wolk, 2008, p. 120). The researcher also found that the questions from the teacher were as important as the questions the children posed. The questioning from the teachers perspective changed from information seeker to deliberative and thought provoking questioning. From the questions that the teacher
asked engaged the child to develop their thinking on various aspects of their investigation and in turn develop their own questioning skills by questioning information they read during their investigation. Questions the children asked ranged from lower order to higher order. The teacher’s questions enabled the child to be guided to their next learning moment and through the adoption of an inquiry stance to learning, question this new found knowledge. This result also supports the opinion of Moyer and Milewicz (2002) where they recognise that teachers who can use a variety of levels to question are able to identify and develop the children’s questioning and thinking.

**Collaboration**

The findings illustrate that the children worked together to learn within this study. They recognised the values that each person brought to their group and formed a community of inquirers within their group. Each group worked differently, depending on what suited them, however had comparable outcomes. The teacher did not need to organise the groups and give specific roles to them. The evidence presented in teacher observation notes about how each group organised themselves during group work recognises how children can be allowed autonomy as to how they organise themselves. This in turn contributes to their developing concept of themselves as agents in their own learning. The teacher could not have predicted how well all the students worked together in the inquiry. On greater analysis the researcher recognised that all students were given this freedom to learn what interests them due to the structure of taking an inquiry stance to learning. Short recognised this collaboration emerges from the engagement with an inquiry stating that “inquiry goes beyond cooperation to collaboration where students think together, not just work together” (Short, 2009, p. 17).
Agency

Agency occurs when people make personal choices and decisions which have an effect on them. The data in chapter four illustrated that once the children made a personal meaningful connection with their learning their sense of agency began to emerge. The children guided where they wanted to go with their own learning and this was due to the actual nature of an inquiry approach to teaching and learning where value is placed on the learning being led by the child. These findings resonate with the work of Pole, Mizen and Bolton (1999) where they recognise that developing agency within a class is down to the practice a teacher pursues. How one chooses to teach a child will result in the ability to develop agency in children. However, the importance of the proactive, deliberative role of the teacher in developing agency through inquiry was not explicit in the literature read. Not being judgemental and encouraging that all answers were deemed valuable from the teacher when the children were creating their concept maps, allowed for all the children to feel that they succeeded in the task and that using their own initiative was positive. The change in the role of the teacher when adopting an inquiry stance to teaching and learning is not something that has been discussed widely in the literature. However, in the context of the primary school curriculum that is moving towards more definitive statements about learning outcomes (NCCA, 2019), this focus on the role of the teacher in an inquiry based learning classroom warrants more attention.

The ability to become an agent of change

The data presented that in order for children to become agents of change they needed to view themselves as having this ability to make changes. The children in this study did not see themselves as being able to make changes in their world until stage 4 of the inquiry cycle.
Before this stage of the inquiry, children believed that it was only adults who had this power to make changes. However, the children were exposed to the fact that everyone can make a change, through research and active involvement in the inquiry. This inspired the children to take action as they could now see what exactly they could do by doing a litter pick up or informing others of the need to reduce the plastic in the world. The children felt it would make their life better and they have the ability to make changes now. This is resonated in the work of Smith (2012) and Winograd (2016) where children took action when they were able to see themselves as active agents. This inquiry cycle in this study was set up to allow children to view themselves as having this ability to take action and become an agent of change.

*Citizenship*

When the researcher refers to a good citizen she is referring to a person who does the best for the world around them. Dunne (2008) recognised how the traits of inquiry brings citizenship to the fore, where children are guided to take action in the world requires that innate sense of being a good citizen. On the face of the data the children’s role as a citizen grew within this inquiry. When the children were learning about how humans make choices which has an impact on the world around them, their citizenship was entangled with this and as the child’s learning developed their understanding of their roles as citizens came to the fore. The children wanted to do the best they could to have a better world to live in from Grace creating a story showing the importance of picking up litter, to Gary encouraging people to carpool to school, to the children going to other classes to encourage them to bring reusable bottles to school, rather than plastic ones so as to reduce the amount of plastic they find dumped all over the world. The children saw many opportunities to act as a good citizen within this inquiry and acted upon it. Dunne (2006) recognises that in order to develop children who will care about the world around them an education needs to be created where
children, citizenship and education are entangled together. The traits of inquiry have led to create a teaching practice where children, citizenship and education develop together.

In summary, within this four week unit of unit of inquiry multiple skills and dispositions evolved. Recognisable from the data was the recursive nature of the skills and dispositions that developed. One skill developed simultaneously with others. Evident in the findings was the richer the questions that the children asked, the richer their investigation. The critical thinking the children were involved in, relied heavily on the questions that they posed. Similarly in a study by Buhrow and Upczak Garcia (2006) in the United States of America where they found that putting time into questioning during the inquiry resulted in the children’s metacognition skills being built upon simultaneously. When the teacher had a focus on developing the children’s questioning skills, problems emerged from these questions which was followed by development in the students’ thinking. Hence the children started to develop their problem solving and critical thinking skills.

**How does teaching through inquiry enable the students to problem solve?**

The basis of inquiry as a pedagogical practice is that it has at its core a problem or a tension that requires the children to carry out research and to come up with a solution that addresses the problem. Within this current case study, reported in chapter four, each group unravelled different problems depending on what they were interested in. In Hannah, Ian and Daisy’s group they identified the problem that animals are dying because of things that humans do; “throw rubbish in lakes” (teacher observation notes). The structure of the IBL cycle provided opportunities for Hannah, Ian and Daisy to investigate and analyse this problem. The children came to a conclusion that people need to dispose of their litter correctly
in order to reduce the animals that get caught in plastic in the water. This group then wanted to share this call to action with others and so they wrote poems to reach out to their peers (Figure 18).

**Figure 18**

*Poetry from Hanna, Ian and Daisy’s group*

In conclusion the structure of an inquiry cycle allows problems to be established, analysed and discussed in order for children to come to solutions. Barron and Darling-Hammond (2010) explain this as children do not “develop the ability to analyse, think critically, write and speak effectively or solve complex problems from working on more constrained tasks that emphasise memorisation” (p. 200). The practice of inquiry is in
complete contrast to the practice of learning through memorisation; it is learning through what is of interest to them, it puts the student at the centre of his or her own learning. An inquiry stance allows children to develop their problem solving skills and identify actions within their reach. A core element of this process is the fact that in the first instance children recognise that they have agency in the learning process and secondly that children then activate this agency to become agents of change in their communities.

**How does teaching through inquiry enable students to act with agency?**

An inquiry stance to learning, opens doors for agency to grow. This is due to a core tenet of inquiry based learning, i.e. it is learner led. The learner has permission to make their own learning choices and to follow their own interests. This case study, found that once the children adopted this inquiry stance to learning their agency was evident. At the beginning of this unit of inquiry the children were hesitant to tell what the environment means to them as it may not be viewed as the “correct” answer. However, once the children recognised that all answers were correct they allowed themselves to make their own learning choices, such as what to focus on investigating. Some children were interested by the floods and others by the animals that were dying as a result of things people were doing. Coupled with, the emergence of the children’s citizenship, their agency was evident. In one group they answered their call of action to reduce the number of plastic bottles in circulation in their school. The children chose what to learn and how they were going to reach new conclusions. This is echoed in the literature where Torres-Harding, Baber, Hilvers, Hobbs & Maly (2017) recognised in a study in the United States of America, in order for agency to be effective it is required to be student centred. Hence why an inquiry led by the students resulted in the children’s agency being a common theme throughout. Therefore in answering the research question, how does teaching
通过 inquiry enable the students to act with agency?  It is because of the student led approach that is adopted.

**Additional Findings**

**Teacher Learning**

On examination of the researcher’s own notes recogniseable was the importance of the role of the teacher in this inquiry, from the beginning and continued throughout each stage of the inquiry cycle. I, the teacher thought that my role would not make a difference to the learning progressing, where regardless of my actions, as long as the children followed the inquiry cycle that they would develop the same skills and dispositions. However, the opposite was the case and the way I played out my role as teacher was paramount. As teacher, I made proactive and deliberative decisions in interacting with the children and when to collaborate and question them on their learning journey. I learned to let go of control of what content exactly the children would learn and instead guide them on the path of learning through the inquiry created. I applied this theory to practice. This new role involved changing how I teach, which made me realise the importance of the kind of role the teacher must adopt within an inquiry approach to teaching and learning. This supports what Short (2009) recognises that “how we teach influences students as much or more than what we teach” (p. 11). How we teach has an influence on the skills and dispositions a child develops for life, as well as the topical learning that occurs. Inquiry as a pedagogical practice that meets the aims of the curriculum and acknowledges that in teaching one must “prepare the child for further education and lifelong learning” (National Council for Curriculum and Assessment, 1999, p. 7).
Importance of Each Stage within Short’s (2009) Inquiry Cycle

Within this study the children did not readily accept the opportunity they were being given to follow their own lead in their learning at the start of the inquiry cycle. The children sought for the teacher to provide them with the “correct” answer rather than establishing what the environment means to them and recording this. However, the importance of the actions of the teacher were at the fore once again. The teacher provided the children with reassurance that no answer would be viewed as incorrect which enabled the children to view this stance to learning in a positive light. From this highlighted was the importance of following each of the stages within the inquiry cycle, if a stage was skipped, a chance to develop the children’s skill would be too. Short’s (2009) inquiry cycle was designed for children to follow through each of the stages. This case study highlights this importance. The data presented in chapter four shows that if the children had not gone through the early stages of the inquiry that they would not have reached the ability to think critically about their investigation. The children would have missed the opportunity to question what was happening in their environment and to make a connection with it, which their critical thinking grew from. One cannot skip a stage.

Conclusion

This chapter presented the key discussion points in terms of the research questions from the findings of this case study as well as additional findings which the researcher uncovered. This case study established the multiple skills and dispositions that a child develops as they adopt an inquiry stance to learning. The skills and dispositions of problem solving, critical thinking, questioning, collaboration, citizenship, agency and the ability to become an agent of change developed as the children moved from stage 1 of the inquiry cycle
to stage 6. The researcher explained how teaching through inquiry enables the children to act with agency and problem solve. The additional findings highlight the importance of the actions of the teacher within an inquiry as well as the importance of following each stage within the inquiry cycle. Chapter 6, will conclude the research study and summarise the main findings, recognise the limitations of the study and suggest recommendations.
Chapter 6: Conclusion

Introduction

The aim of this study was to examine the learning skills and dispositions that develop as students and teachers adopt an inquiry stance to classroom practice. A qualitative approach through a case study sought to uncover the skills and dispositions the children develop through inquiry. The researcher conducted this research with her own class of eighteen third class students. One could not predict how much the children would grow in their learning through this inquiry. Although the results from this study cannot be generalised, they may be relevant to other teachers considering teaching through inquiry, in explaining the importance of the teacher’s proactive actions within an inquiry from their adoption of an inquiry stance to the deliberative questions they ask of the children. The teacher within this study was amazed at the responses she received from the children and endorsed the evidence of the importance of teaching through inquiry. Therefore, the key findings will be summarised in this chapter, as well as presenting the limitations and recommendations that evolved from this study.

Summary of Key Findings

In using a case study methodology, the mains findings of this research study provided the researcher with an insight into the skills and dispositions that develop through inquiry. One main research question framed this research study as well as two sub research questions;

- What skills and dispositions are developed as students and teacher adopt an inquiry stance to learning in a mainstream primary school classroom? (Main Research Question)
• How does teaching through inquiry enable the students to problem solve? (Sub Research Question)

• How does teaching through inquiry enable students to act with agency? (Sub Research Question)

Data was gathered in the form of the children’s work samples, photographs, observation and researcher’s notes. Four themes emerged from analysing the data collected within this study. Firstly, the children did not readily adopt an inquiry stance to learning. The children questioned the teacher in order to be provided with a “correct” answer to what the environment means to them. Secondly, multiple skills and dispositions developed in engaging with an inquiry. The children’s agency in controlling their learning grew. From this the children developed their ability to question and in turn think critically about problems that emerged. The researcher found that these skills and dispositions did not develop alone but in unison. In developing as a citizen within this inquiry, resulted in the children wanting to take action to make their locality a better place. This is evident when Gary wants to “take care of the environment” by doing “less driving and more walking.” Lastly, the teacher developed her own learning throughout. She recognised the impact of adopting a proactive and deliberative stance to practice has on the children’s learning development.

Limitations

Within all research studies, there are various limitations. Firstly, the researcher recognises that this is a small scale study with a small number of students, therefore this limits the conclusions to be drawn from this study. The researcher has provided detailed information for this to be altered and amended to identify if the same results are found with a different
group of students. From the data, it emerged that no child struggled with this unit of inquiry, after adopting an inquiry stance to learning. The researcher recognises that the children involved within this study were a fairly homogenous group with no SEN or EAL learners, where language may have impacted on the results. The children as a group are eager to learn and strive to be the best that they possibly can. As a result of the nature of the group, may have consequences to how they engaged with the inquiry unit.

By nature a case study is interpretive, however this made this case study unique. The same findings would not have been found in numerical data. The researcher ensured data triangulation was adhered to throughout data analysis, so that a finding could be found in another silo of data. Additionally, as the researcher has identified that she is passionate about inquiry based learning, she ensured that there was a data collection plan in place. Notwithstanding the limitations identified, the following recommendations are proposed.

**Recommendations**

1. The researcher recognises that this is a small scale case study with this group of students, at a given time. Further research is recommended in the area of inquiry based learning, within an Irish primary school context.

2. At policy level the design and development of bespoke, nationally co-ordinated CPD courses which clearly define inquiry as a pedagogical practice and provide practical examples of how inquiry could be incorporated into ones classroom is suggested.

3. Regarding the researcher’s own school context, she will engage in dialogue with staff members to explain the proactive and deliberative role of the teacher in
teaching inquiry and discuss how inquiry can be incorporated into the researcher’s own school.

4. Regarding the researcher’s own teaching, findings from phase 1 and 2 of this inquiry cycle will inform her own practice for teaching phase 3 of the inquiry cycle.

Conclusion

In this study the children’s ability to become agents of change grew as the inquiry progressed. What the researcher has learned from phase 1 and 2 of this inquiry cycle will inform her approach to teaching the final phase of this inquiry cycle where the children now have this vision for themselves as an agent of change. It was worth stopping to research the early stages of the inquiry cycle in order to conduct a fine grained analysis of these stages and in order to inform teaching of the later stages. This highlighted micro-elements of the process that are in fact central to successful implementation of subsequent cycles. The teacher now can create learning moments to anchor this for the children to take action.

Through a real life example of research in an Irish primary school classroom, this study offered an invaluable insight into the skills and dispositions that a child acquires when adopting an inquiry stance to teaching and learning. The findings of this study correlate with the relevant theoretical policy and practice literature in inquiry based learning with additional findings presented. The results also offer an alternative teaching practice for one to develop in their classroom. Similarly to how Winograd (2016) remarks that inquiry should start on a small, local level at first, before trying to solve problems that are too large for a child to imagine. So too should an educator, start by bringing inquiry into the class slowly until the
educator feels comfortable with teaching through inquiry. As the findings indicated that the role of the teacher is key, through the design and facilitation of an inquiry by making proactive and deliberative decisions throughout the IBL cycle.

More needs to be done in educating those involved in curriculum development and in educating CPD course designers as to the advantages and traits of inquiry as a pedagogical practice to provide for effective reforms in current education. Perhaps nothing would convince other teachers to adopt an inquiry based learning approach to practice as much as the words from one of the students in the current research study. When Grace said ‘Teacher, I'm thinking about things I never realised before, I've so many questions”, this was all the evidence I needed to confirm the significance and importance of Inquiry Based Learning in the development of learning skills and dispositions.
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http://www.project2061.org/publications/bsl/online/index.php


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**Appendices**

**Appendix A**

**Inquiry Unit of Work Plan**

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<tr>
<th>Unit title:</th>
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<td>Start date:</td>
<td>10/2/20</td>
<td>End Date:</td>
<td>20/3/20</td>
</tr>
</tbody>
</table>

**Big Idea:**
What is the overall understanding that I want my students to achieve?

In interacting with natural habitats, humans make choices that have an impact on other living things.

**Key Concepts:**
1. Causation and Responsibility
2. Interdependence and Choice

**Key Competencies:**
Questioning
Metacognition
Collaboration skills
Oral and written language skills
Agency

**Lines of Inquiry (An Inquiry into):**
What lines of inquiry will we embark on?

- How do living things respond to changing environmental conditions?
- How do humans impact the natural environment?
- How do humans use the local environment?
- How are natural spaces valued in the environment?
- What actions do humans take that benefit or harm the environment?
- How is our local environment changing?
**Teacher Questions:**
What teacher questions will drive these inquiries?

- In what way do we use the natural environment?
- How is our local environment changing?
- To what extent is the environment changing in other parts of the world?
- What effect does this have on us?
- Do we have any responsibility in looking after the world we live in?
- What actions do we take that harm/protect our environment?

**What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?**

1. **Teacher observation:** I will observe the children throughout the inquiry to assess how they are progressing through the inquiry unit, particularly with regard to:
   - Questioning Skills
   - Collaboration Skills
   - Metacognition
   - Their Agency

2. **Concept Map:** The children will be given an A3 page during the connection stage of the inquiry cycle. The children will write or draw a response to the question “What does the environment mean to me?” (in red pen). Throughout the inquiry the children will be able to add to this in a black pen. At the valuation stage of the inquiry the children will complete the same activity again and add to their answer to what the environment means to them (in blue pen). I will be able identify some of the new understandings the children have gained, when I compare the three.

3. **Learning Log:** The children will have a learning log booklet where they can record things that they feel important to them during the inquiry. During the tension stage of the inquiry cycle the children will stick in a photo that they have taken while we were on our environment walk of something that grabbed their attention while in their environment. They will engage in their See, Think, Wonder activity in their learning log booklet. The children will also have their learning log booklet with them throughout the cycle, where they can draw or write anything that they feel is important or questions that they have.

4. **Presentation:** I will assess the children in groups throughout their oral presentation with use of an oral presentation rubric. (see data collection plan for more information)

**Tran disciplinary skills development**
What opportunities will occur for tran disciplinary skills development and for the

Communication skills – listening, speaking
Questioning skills – questioning, synthesising, comprehension.
### Development of the Attributes of the Learner Profile?

- **Presentation skills** – verbal communication, delivery.
- **Social skills** – collaborating, cooperating, group decision making, turn taking.
- **Critical thinking skills** – clarifying, questioning.

### What Resources Need to Be Gathered?

What people, places, audio-visual materials, related literature, music, art, computer software, etc will be available?

- The materials throughout the inquiry will be adapted as the children will drive the inquiry (paper of different sizes, scissors, pens, markers and colouring pencils).
- Sheet with question “What does the environment mean to me?” in the middle.
- See, Think, Wonder recording sheet.
- Photos illustrating how pollution is affecting our wildlife.
- Computer room, ipads and books on pollution for research.

### Inquiry Unit Based on the Inquiry Cycle by Kathy Short (2009)

![Diagram of Inquiry Cycle](https://via.placeholder.com/150)

(Source: Short, 2009, p. 19)
<table>
<thead>
<tr>
<th>Lesson Plan Overview</th>
<th>The Inquiry Cycle titled The Authoring Cycle (Short, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage</strong></td>
<td><strong>Phase (for data collection)</strong></td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Invitation</strong></td>
<td>1</td>
</tr>
</tbody>
</table>
| **Tension** | 1 | See, Think, Wonder: I will have the children’s photos that they took while on their walk printed out. The children will pick one of the photos that they have taken. The children will answer three questions based on the photo.  
1. What do you see in the picture?  
2. What do you think is happening?  
3. What are some of the questions you have now?  
Discussion: Through a class discussion we will establish what sort of questions the children have and what they are wondering. |
<p>| <strong>Investigation</strong> | 2 | I will regroup the children if necessary from at the start of the cycle, depending on the questions they have. Each group will be given the opportunity to research whatever aspect of their natural environment that they are interested in, after viewing the pictures during the tension stage. During the investigation I will invite the children to add to their piece of paper with the question “What does the environment mean to me?” in the centre (in black pen). |</p>
<table>
<thead>
<tr>
<th>SKILLS AND DISPOSITIONS DEVELOPED THROUGH INQUIRY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demonstration</strong></td>
</tr>
<tr>
<td>Through teacher observation, I will identify when certain groups require a mini lesson. I will use the mini lesson to teach certain vocabulary to them or certain tools they may require when researching online. It will vary, depending on what each group requires.</td>
</tr>
<tr>
<td><strong>Re-Vision</strong></td>
</tr>
<tr>
<td>I will intervene with some groups while they are working and revise what they have learned already. I will ask them about the questions that they are trying to find an answer to in order to move their learning to the next stage if they are finding it difficult to move forward with their learning. The children will be invited to add to their concept map titled “what does the environment mean to me?” with black pen.</td>
</tr>
<tr>
<td><strong>Representation</strong></td>
</tr>
<tr>
<td>The children will present their findings to the class from their research through a group presentation. Some groups may choose to present a course of action that they plan to take along with their findings. They will be given the choice on how they would like to present these findings, whether it be through a poster or a piece of art work to accompany their group presentation.</td>
</tr>
<tr>
<td><strong>Valuation</strong></td>
</tr>
<tr>
<td>The children will be given the same piece of paper from the connection stage of the inquiry cycle with the question “What does the environment mean to me?” in the centre. The children will draw, write or describe (in blue pen) what the environment means to them, given what they know now and after researching the tensions, questions and problems that they came across. A class discussion will follow this where the children will talk about what the environment now means to them.</td>
</tr>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Following the class discussion on what the environment means to the children, I will direct the children to discuss what they could do, now that they know all this information. The children will take action, wherever they see fit. They will be given the choice to do this individually, in groups or not at all.</td>
</tr>
</tbody>
</table>
Appendix B

Stages in Analysing Different Data Types

- **Observation Notes and Researcher Notes**
  - Finishing writing notes as soon as possible for teaching
  - Reading and re-reading to familiarise myself with the data
  - Coding
  - Searching for, naming and renaming themes
  - Writing up findings

- **Children’s Work Samples**
  - Reading and re-reading to familiarise myself with the data
  - Coding
  - Searching for, naming and renaming themes
  - Writing up findings
Appendix C

Data Analysis - Coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Code Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAL</td>
<td>Analysis</td>
</tr>
<tr>
<td>INT</td>
<td>Interpretation</td>
</tr>
<tr>
<td>INF</td>
<td>Inferencing</td>
</tr>
<tr>
<td>EXP</td>
<td>Explanation</td>
</tr>
<tr>
<td>SR</td>
<td>Self Regulation</td>
</tr>
<tr>
<td>OM</td>
<td>Open Mindedness</td>
</tr>
<tr>
<td>PS</td>
<td>Problem Solving</td>
</tr>
<tr>
<td>QS</td>
<td>Questioning</td>
</tr>
<tr>
<td>HO</td>
<td>Higher Order</td>
</tr>
<tr>
<td>LO</td>
<td>Lower Order</td>
</tr>
<tr>
<td>F</td>
<td>Facts</td>
</tr>
<tr>
<td>AG</td>
<td>Agency</td>
</tr>
<tr>
<td>ACT</td>
<td>Action</td>
</tr>
<tr>
<td>AOC</td>
<td>Agent of Change</td>
</tr>
<tr>
<td>S</td>
<td>Social</td>
</tr>
<tr>
<td>COL</td>
<td>Collaboration</td>
</tr>
<tr>
<td>OL</td>
<td>Oral Language</td>
</tr>
<tr>
<td>W</td>
<td>Writing</td>
</tr>
<tr>
<td>G</td>
<td>Gaeilge</td>
</tr>
<tr>
<td>TW</td>
<td>Team Work</td>
</tr>
<tr>
<td>CT</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td>C</td>
<td>Care</td>
</tr>
<tr>
<td>CS</td>
<td>Citizenship</td>
</tr>
<tr>
<td>VOC</td>
<td>Voice of the Child</td>
</tr>
<tr>
<td>EE</td>
<td>Examining Evidence</td>
</tr>
<tr>
<td>ASM</td>
<td>Assumption</td>
</tr>
<tr>
<td>CON</td>
<td>Consequence</td>
</tr>
<tr>
<td>INQ</td>
<td>Inquisitive</td>
</tr>
</tbody>
</table>

Sample of Data Analysis Coding in Children’s Work
## Appendix D
### Outline of Data Collection

<table>
<thead>
<tr>
<th>Stage of the cycle</th>
<th>Data Collection Phase</th>
<th>Day</th>
<th>Children to be Observed</th>
<th>Skills/Dispositions to be Observed</th>
<th>Data to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>1</td>
<td>Monday 10(^{th}) Feb</td>
<td></td>
<td>Metacognition Agency Oral and written language skills</td>
<td>Concept Map, Teacher Observation</td>
</tr>
<tr>
<td>Invitation</td>
<td>1</td>
<td>Wednesday 12(^{th}) Feb</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td>Teacher Observation</td>
</tr>
<tr>
<td>Tension</td>
<td>1</td>
<td>Friday 14(^{th}) Feb</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td>Learning Log, Teacher Observation</td>
</tr>
<tr>
<td>Investigation</td>
<td>2</td>
<td>Monday 24(^{th}) Feb</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td>Learning Log, Teacher Observation</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Wednesday 26(^{th}) Feb</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Monday 2(^{nd}) Mar</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Wednesday 4(^{th}) Mar</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Monday 9(^{th}) Mar (if required)</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td></td>
</tr>
<tr>
<td>Demonstration</td>
<td>2</td>
<td>Wednesday 26(^{th}) Feb &amp; Monday 2(^{nd}) Mar</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td>I will not be collecting data during this stage</td>
</tr>
<tr>
<td>Re-Vision</td>
<td>2</td>
<td>Monday 2(^{nd}) Mar</td>
<td></td>
<td>Metacognition Questioning skills Collaboration Agency</td>
<td>Concept Map</td>
</tr>
</tbody>
</table>
Appendix E

Letter to School’s BOM

1st December 2019

Dear [redacted],

I am currently completing Year 2 of a Masters in Education Studies (Inquiry Based Learning) at the Marino Institute of Education (MIE). As part of this course I will be engaging in a research study on children’s agency.

The children will be learning Science through an inquiry based approach whereby they will explore the concepts presented to them through questioning and by posing problems and scenarios. The children will be facilitated with opportunities to discuss and think about the content within a context that is suited to their needs.

To analyse the children’s learning which takes place during these sessions, it may be necessary to provide evidence of engagements and conversations throughout their learning experience by taking audio recordings, photographs and photocopies of work samples. I will send out a letter to the parents/guardians of the children in my class, to seek permission for this. Data collected will be used for examination purposes only. College regulations require that data is stored for 18 months after examination. After this time, all recordings and samples will be destroyed. Parents may remove their child from the process at any time.

If a parent/guardian decides not to allow their child to be audio recorded, photographs taken of them and photocopies of work samples, for the purpose of the research project, he or she will still participate in the classroom lesson, but their data will not be used within the research study.

I am seeking permission to undertake this research with my current class of [redacted]. If you have any questions or seek clarification on any of the above please do not hesitate to contact me. This study has been considered from an ethical perspective by the Marino ethics in research committee. Should you have any questions or concerns about the ethical approval or conduct of this study, please contact MERC@mie.ie.

Thanking you for your support,

______________________________

Hannah McKenna
Appendix F

Consent Form (Parents)

Dear Parents and Guardians,

I am currently completing Year 2 of a Masters in Education Studies (Inquiry Based Learning) at the Marino Institute of Education (MIE). As part of this course I will be engaging in a research study on children’s agency and their ability to problem solve.

To analyse the children’s learning which takes place during these sessions, it may be necessary to provide evidence of engagements and conversations throughout their learning experience by taking audio recordings, photographs and photocopies of work samples.

If you agree to allow your child to be audio recorded, photographs taken of them and photocopies of work samples, for the purpose of the research project, your child’s identity will remain completely confidential. His or her name will not be attached to any information I collect nor will they be identifiable in any photograph. This information will not be used by anyone other than qualified researchers working on this study. All children will remain anonymous throughout the process. Data collected will be used for examination purposes only. College regulations require that data is stored for 18 months after examination. After this time, all recordings and samples will be destroyed. You may ask that your child be removed from the process at any time.

If you decide not to allow your child to be audio recorded, photographs taken of them or photocopies of their work samples used, for the purpose of the research project, he or she will still participate in the classroom lesson, but their data will not be used within the research study.

If you have any questions or seek clarification please do not hesitate to contact me. This study has been granted ethical approval by the Marino Ethics in Research committee.

If you agree that your child can participate in the study, I will also ask your child to give consent separately.

If you agree that your child can participate in the study, can you please sign the attached and return to me by 17/01/20.

Thanking you for your support

__________________________________

Hannah McKenna
Child’s name (please print):________________________

Please tick all that apply:

☐ I consent to photographs of my child being taken.
☐ I consent to audio recordings of my child being taken.
☐ I consent to use of my child’s work samples.

Parent / guardian signature________________________ Date:________________________
Appendix G

Consent Form (Children)

16/01/2020

Dear Rang a Trí,

As you know I am back at college studying and have some homework that I need your help with. In class we are going to be doing a project about the world around us.

In order for me to see what you are learning I may need to take photocopies of your wonderful work, photographs or voice recordings of what you are saying. I will need to include these along with my homework that I give to my teacher in college. I am writing to you to seek your permission for this. I will be the only one that knows who owns the work that you have created. Your name will not appear on any work that you create as part of this project. During this project you have the option to leave or join the research at any time.

Included with this letter you will see a permission slip for you to fill in.

If you have any questions, just ask me.

Yours sincerely,

Ms. McKenna
Name (please print): _________________________

Please tick if you agree:

☐ I consent to photographs of myself being taken.

☐ I consent to voice recordings of myself being taken.

☐ I consent to use of my work.

Signature: _______________________________ Date: _____________________