

What Can be Learned from a Local Stream?

Can using Inquiry-Based Learning (IBL) in a school's local outdoor environment have an impact on young learners' motivation, engagement and disposition towards learning?

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“People should, if possible, learn wisdom not from the books, but from the heaven, the earth, and from the oaks and beeches that means to know and cognize the things themselves and not only by a foreign observation and testimony about things.”

J. A. Comenius, The Great Didactic (1958)

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. Karin Bacon at the Marino Institute of Education, Dublin. I agree that the Library may lend or copy this dissertation upon request.

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Abstract

The Irish primary curriculum, described as an “anthology of subjects”, is overloaded, often to the detriment of teachers, school management and most importantly, the students. There is a need for a more integrated approach to the curriculum, one which could be provided by incorporating outdoor Inquiry-Based Learning (IBL) in schools’ local environments. This study had two key aims: 1) to investigate if a school’s local environment provides opportunities to stimulate IBL and 2) to examine if primary school students are impacted by engaging in IBL, and how.

A qualitative approach was followed, in order to evaluate the learning experiences of 4th Class primary school students during a case-study of outdoor IBL. A variety of research instruments were used to capture the data including observation during site visits, photographs, interviews, and children’s work samples, which led to some rich data being generated, powerful insights being recorded and offered a window into the mind of some inquisitive young learners.

The findings illustrated that a school’s local environment can be a rich resource for education. By studying the local history, geography, science and/ or environmental issues through IBL, children can make meaningful connections to their own life, leading to a deeper level of engagement and conceptual understanding. Children were increasingly motivated, engaged and generally more content during the outdoor IBL. This research may prove useful to IBL practitioners, teachers, Irish policy makers and anyone with an interest in education.

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List of Abbreviations

APA – American Psychological Association

ASD - Autism spectrum disorder

CASTeL – Centre for the Advancement of STEM Teaching and Learning

DEIS - Delivering Equality of Opportunity in Schools

IBL – Inquiry-Based Learning

NCCA – National Council for Curriculum and Assessment

OE – Outdoor Education

RDS – Royal Dublin Society

SESE – Social, Environmental and Scientific Education

SFI – Science Foundation Ireland

STEM – Science, Technology, Engineering and Maths

Chapter 1: Introduction & Background

Introduction

Inquiry-Based Learning (IBL) is an educational stance that has been garnering increased attention since the latter half of the twentieth century. This learning approach places significant importance on learners' previous connections and curiosity. These help to create the stimulus which enable meaningful learning engagements and a deeper understanding of curricular content to take place (Short, 2017; Murdoch, 2015; Wolk, 2008).

My initial experience in the field of IBL stemmed from becoming involved in the RDS STEM¹ Learning Programme (Science, Engineering, Technology and Maths), as a primary school teacher. This project focused on an inquiry-based approach in STEM. I developed a keen interest in the IBL approach and its application in Irish primary education. I began to use an inquiry-based approach in my teaching and became a facilitator with the RDS STEM programme. Having returned to study IBL at Masters' level, my interest in the area has grown further, particularly considering the opportunities that it can provide for primary education.

As a student, I have enjoyed the ownership and direction I was able to take with my learning through an IBL approach, as well as the seemingly endless possibilities for investigation. I became particularly interested in outdoor IBL opportunities. Having completed a successful IBL project with fourth class students about the hidden history in their local town, I decided to focus my research on the opportunities for learning through inquiry that are available in a school's outdoor environment. Having read "Last Child in the Woods"

¹ The RDS STEM Learning Programme was developed in 2012 by the RDS, St Patrick's College of Education and CASTeL, SPD/DCU, and was scaled-up in partnership with SFI Discover from 2015 - 2016. It provided CPD to primary school teachers in teaching STEM through an inquiry-based approach.

(Louv, 2005), I felt that IBL in a school's local environment could help to reconnect children to nature and their local environment, facilitating deeper levels of connection and understanding throughout the learning experience.

Relevance of this Research

There are a number of reasons why this research may be of interest to anyone involved in the education of young learners. While the perceived benefits of IBL are explored further in the Literature Review chapter, some of the most relevant from an Irish primary education perspective are outlined below.

Successful learning is rooted in previous knowledge and personal connections.

One of the fundamental aims of the Irish curriculum is that “the child’s existing knowledge and experience should be the starting point for acquiring new understanding” (NCCA, 1999, p. 22). Similarly, IBL begins with connection, valuing a learner’s previous knowledge and life experience at the start of a cycle of inquiry. Inquiry students become much more interested in exploring a topic as they can link its relevance to their own lives as they connect new learning to their own lived experience, (Stripling, 2003; Short, 2009; Chiarotto, 2011).

Connections to the local outdoor environment can lead to a deeper conceptual understanding.

The 1999 curriculum notes the significance of exploring the school’s local area, particularly in the area of SESE: “One of the most important aspects of the geography curriculum and the wider SESE programme is the emphasis placed on the exploration of the local environment of the child and school” (NCCA, 1999, p.26). As research by Barlow (2016) suggests, meaningful connections to and understanding of the wider world can only be made through the lens of the local area. An IBL approach in a school’s own locality could

enable learners can make deeper connections, seeing the history, geography and science in the local area as a microcosm of the wider world.

Current literature suggests that Irish students' experiences of outdoor learning is contradictory and in some cases an over-reliance on textbooks has been found (Murphy, Varley, & Veale, 2012). This research can provide an insight into whether using the school's local environment can help children to develop a deeper sense of understanding and helping them to understand key concepts about the wider world around them.

IBL can promote in-depth learning while reducing curricular overload.

The 1999 Irish Primary Curriculum is presented in terms of its individual subject areas, and while it makes recommendations for linkage and integration across subjects, there appears to be a congestion or curricular overload (Gleeson, 2010; Walsh, 2016; NCCA, 2010; Coolahan, 2003). Currently, the Irish Primary Curriculum is undergoing a period of review and redevelopment and, while a more integrated approach is being considered in the early years of primary school (NCCA, 2019), cross curricular integration could benefit all learners (Hayes, 2010). IBL could facilitate an integrated approach to primary education in Ireland as proposed by Bacon (2018). IBL is less about learning predefined facts or information and more about enabling the development of life-long learning skills. It facilitates a deeper level of engagement in learning, through investigation, collaboration and the learner's sense of ownership in their studies.

Research Objectives

The objectives of this research have been framed by the following research questions:

- Can the outdoor environment of a school provide a good stimulus for Inquiry-Based Learning (IBL)?
- Does engaging in a cycle of IBL impact upon student learning and how?

This research takes the form of a case-study, exploring the engagement of young learners in an outdoor unit of IBL, over a four-week period. The research instruments used to document this include the qualitative observations of the researcher, three focus group interviews each with four participants, four video interviews each with a participant and their parent, work samples and photographs. The objectives of the research were:

- To review the relevant literature on IBL and Outdoor Education.
- To define IBL for the purpose of this study and to develop a framework for possible use by students and educators in outdoor IBL.
- To explore children's attitudes to and experiences of IBL in their local environment.
- To investigate whether a school's local environment is a good stimulus for IBL.
- To investigate if outdoor IBL leads to deeper conceptual learning amongst participants during a cycle of inquiry.

Dissertation Structure

In this chapter, the topic of IBL in education is introduced and the relevance of researching outdoor-based IBL is outlined. The overall aim of the research is outlined, and the objectives of the study are presented.

Chapter two presents a review of the literature in the fields of IBL and Outdoor Education. The origins of IBL are traced from Socratic times to the present era, and the growth of alternative school models, with predominantly "learner-centric" aims, is explored. The lack of a consistent, agreed upon definition of IBL is examined, and the perceived benefits and criticisms of this educational stance are analysed. IBL is then explored from an Irish perspective with inconsistencies between a curriculum which calls for a child-centred, hands-on approach and the actual experiences of some learners. Outdoor Education is also

analysed and, as with IBL, there are inconsistencies with its definition, which are explored. Benefits and barriers to Outdoor Education are examined, with a consensus that young learners today are exposed to much less outdoor learning than previous generations. The theory of affordance, proposed by Gibson (1986), is investigated. Outdoor Education is then evaluated as a vehicle for curriculum. Finally, Cycles of Inquiry are presented and analysed, and the Framework for Outdoor Inquiry (*Fig. 7*) is presented for the purpose of this research, and for potential use by future learners and educators.

Chapter three describes the methodological approach of this study. The context of the study is outlined as well as the philosophical foundations underpinning the research. The rationale for using a qualitative approach is presented as well as the grounds for using a case-study approach. The research instruments used to generate and gather the data for this study are then presented. Robustness of the research, researcher positionality and ethical considerations involved in the research are identified and discussed as are limitations of the research approach.

In chapter four, the findings of the study are presented and analysed. The extent to which the school's local environment, the setting of this inquiry, presented affordances to stimulate learner curiosity is examined, as well as the impact of outdoor IBL on student learning. Throughout this chapter, correlations are made between the case-study findings and themes from chapter two.

In chapter five, the outcomes of the previous four chapters are tied together in order to best answer the research questions and offer conclusions to the reader. Limitations of the research are outlined, and recommendations are proffered with regards to outdoor IBL in primary schools. To conclude the dissertation, potential areas for new research arising from this study are suggested.

Chapter 2: Literature Review

Introduction

As suggested by the dissertation title, the purpose of this research is twofold, within the realms of Inquiry-Based Learning (IBL) to explore:

- 1) Can the outdoor environment of a school provide a good stimulus for Inquiry-Based Learning (IBL)?
- 2) Does engaging in a cycle of IBL impact upon student learning and how?

In this chapter, the literature will be explored under three main areas: Inquiry-Based Learning; Models of Inquiry-Based Learning and Outdoor Education in order to best answer the research questions.

Whilst elements of IBL can be traced back to ancient times, the changing face of education in the 20th Century will be the focus here. During this period, the emergence of different styles of teaching and learning offered alternative viewpoints on how children best learn, many of which share some common threads with the modern viewpoint of IBL. What IBL is, its growth in recent decades, its significance for Irish education as well as its criticisms and challenges will also be examined.

Outdoor Education will be defined for the purpose of this research as well as an exploration of the literature examining its strengths and challenges. Outdoor Education in Ireland will be explored, and the theory of affordance is examined in terms of its relevance to outdoor IBL.

There are many models of the IBL cycle in the literature. In this chapter, five different cycles of inquiry will be explored as well as Erickson & Lanning's (2014) Structure of Knowledge and Structure of Process. As there is no one universal model of the IBL cycle, the Framework for Outdoor Inquiry (*Fig. 7*) is introduced in this chapter, designed purposely

for this and similar research. I will also examine the connections between and possibilities for IBL and Outdoor Learning.

Inquiry-Based Learning (IBL)

Origins.

Elements of Inquiry can be traced back to ancient times, to the educational ideologies and teachings of philosophers such as Plato, Euclid, Confucius and Socrates (Spronken-Smith, 2008; Scott & Friesen, 2013; Milner-Bolotin, 2018). Whilst IBL as we know it today perhaps has roots in a bygone era, its emergence in the modern era has most likely stemmed from the changing nature of education over the course of the 20th and early 21st century. The work of theorists and practitioners in education, such as Jerome Bruner, Maria Montessori, Paulo Freire and John Dewey, amongst others, has helped to shape the face of education and provide an alternative to a traditional, authoritarian and didactic approach, thus creating a space for educational stances such IBL.

Dewey (1938) believed that learning is an active process and that it should be challenging and relate to real life. He was critical of the traditional approach to education in which knowledge learned was “segregated when it was acquired and hence is so disconnected from the rest of experience that it is not available under the actual conditions of life” (p.20). Similarly, Freire, Ramos & Macedo (1993) were critical of the traditional approach, which they call the “Banking System of Education”, where learners are required to learn off and regurgitate facts instead of engaging in deeper meaning (p.72). The authors call for the “Banking” model to be replaced with an approach utilising “the posing of the problems of human beings in their relations with the world” (Freire et al, 1993, p.78).

Montessori appeared to place more of an emphasis on children’s attitudes to learning rather than the achievement of “standard skills” or “advancing them along the ladder of achievement tests” (Crain, 2016, p.90). According to Salazar (2013) Montessori drew on the

laws of nature and the world around to help develop students' problem solving and critical thinking skills. Jerome Bruner placed a strong emphasis on 'Discovery Learning', a method of learning with some similarities to IBL. Discovery Learning is an approach where the importance of learners discovering facts and relationships for themselves is key. Bruner (1979) outlined the value of this type of learning:

The virtues of encouraging discovery are of two kinds. In the first place, the child will make what he learns his own, will fit his discovery into the interior world of culture that he creates for himself. Equally important, discovery and the sense of confidence it provides is the proper reward for learning. It is a reward that, moreover, strengthens the very process that is at the heart of education – disciplined inquiry (pp. 123-124).

By promoting an approach to learning which rejected traditional methods, Bruner, along with educationalists such as Montessori, Freire and Dewey, helped to lay the foundations for contemporary theorists and practitioners proposing an inquiry-based approach in education. Whilst there may be some common threads in the theories and practises of the aforementioned educationalists, there is a clear distinction between these experiential approaches and what IBL is. For the purpose of this study it will be important to define and expound upon what inquiry is.

How is Inquiry-Based Learning (IBL) defined in the literature?

There is no one clear, overarching definition of IBL in the literature, as it is an outlook or stance that extends across different disciplines, from medical inquiry to inquiry in science. What inquiry is understood to be can vary greatly across these different disciplines.

IBL is sometimes incorrectly classified as another name for other approaches to learning, such as Active Learning, Problem-Based Learning and Discovery Learning. Chu, Reynolds, Tavares, Notari & Lee (2018) link IBL to Problem- and Project-Based Learning where participants take on an "inquiry mindset" when involved in learning or completing

projects where there may be endless possible answers (p.9). IBL can vary in its substance: it can encompass short-term or longer-term projects; can be formal or informal in its structure and can be driven by the wonderings of the learner or a problem designed by the educator (Chu *et al*, 2018). What separates IBL from the other approaches is that it is specifically concept-orientated as learners construct a personal meaning of “generalizations and principles” by following a guided process of inquiry (Erickson & Lanning, 2014, p.36).

With differing definitions of, or even versions of IBL in the literature, it would be prudent at this point to define IBL for the purpose of this research. Perhaps best encapsulated by Short as “not a particular teaching method, but a stance” (2009, p. 11). IBL will be understood in this study, to be an educational stance where learners are valued as active participants in a learning process, that has been stimulated by their own personal connections and innate curiosity, enabling them to find a deeper conceptual understanding of a particular subject area. The role of the teacher is to facilitate, question, prod, and collaborate, stress-testing theories and ideas while acting as the driving instructor in the inquiry, leaving the learner in the driving seat.

Principles of IBL.

Inquiry is an educational stance rather than a style of teaching.

Short (2009, 2017) defines inquiry as a perspective which facilitates a deeper degree of engagement and understanding in a learning process, one which has an important connection for the learner. She speaks of inquiry as not one particular strategy but “a stance that underlies our approach to living as learners, both within and outside of school” (Short, 2009, p. 1).

It is a stance through which a greater level of interest and engagement in learning occurs compared with traditional teaching methods. Dana, Thomas & Boynton (2011) maintain that questioning is the key driver of the inquiry process and that inquiry allows deep

and meaningful learning to “become a way of life inside schools” for both the student and staff bodies (p.91). Similarly, Wolk (2008) contends that Inquiry is more than a style of teaching, it moves beyond learning off and memorising facts to developing a culture among students and staff of “disciplined questioning and investigating”. Erickson & Lanning (2014) point to a growing awareness amongst educators that curriculum and teaching must move beyond information and skills to include “deeper, transferable understandings realized at the conceptual level of thinking”.

IBL is built on previous knowledge and connections.

Inquiry-Based Learning is an educational stance where the learner’s viewpoint is an intrinsic part of the learning process. Previous knowledge and connections to learning content are seen as fundamental in stimulating new learning. Chiarotto (2011) gives one example of a new inquiry, where the teacher asked children to bring a rock to school on the first day of term and a map of where they found it. Each child was given the opportunity to share with their classmates diverse stories about how and where they got their rock. This led on to a cycle of inquiry, learning about rocks and minerals. The children had developed meaningful connections to the new subject area which significantly impacted their engagement and motivation in learning. Short (2019; 2017) sees connection to children’s own knowledge and experience as crucial in order for them to construct meaning.

IBL is trans-disciplinary and based on conceptual learning.

According to Wyatt (2005) this learning approach transcends traditional subject boundaries and can prepare students for life-long learning. During this approach students move through processes which help them develop a deeper understanding and a comprehension of profound concepts. It is an approach in which learners are cognitively active and “demands higher order thinking” (Murdoch, 2015, p. 15). In comparison with traditional methods focusing on learning information and facts, inquiry encourages learners to

ask why and to seek answers and explanations (Short, 2009). Short uses the metaphor of a three-year-old to describe what inquiry is:

They engage with life, immersed in what is occurring around them until something catches their curiosity or doubt. This curiosity creates a need to know that they explore through play and observation and through pestering adults with questions. They move from curiosity to knowledge that leads to more in-depth investigations (unless something more compelling catches their attention). These explorations and investigations, in turn, support them in constructing their understandings of the world and in asking new, more complex questions (2009, p. 13).

The growth of alternative schools.

The rise of social constructivism in educational circles has had a significant impact on the course of 20th century schooling and perhaps bridged the gap between traditional, authoritarian approaches and those which value the learner as a key driver in their learning. According to Oldfather, West & White (2003) “A social constructivist perspective focuses on learning as sense-making rather than on the acquisition of role knowledge that “exists” somewhere outside the learner” (p. 8-9). Support for a constructivist approach in education has seen the foundation and development of various new models of schools, each with their own distinctive ethos and curricular frameworks but linked by their perceived “learner-centric” approach. The numbers and types of school models with what might be considered as having these “learner-centric” stances at the core of their curriculum and ethos has continued to grow since the mid-20th century. Recent figures show that there are more than 1200 Steiner schools (Steiner Waldorf Schools Fellowship, n.d.), 5,175 International Baccalaureate schools (International Baccalaureate, n.d.) more than 1000 International Primary Curriculum Schools (IPC, 2020) and approximately 20,000 Montessori schools (National Center for Montessori in the Public Sector, n.d.). While many other school models

have also emerged in recent decades, these examples provide evidence of a demand for a more “learner-centric” education for young learners.

Forest Schools are another quickly growing movement with a strong focus on experiential learning. The Irish Forest Schools Association provide a definition of Forest School as “a learner-centred or child-led process with close links to regular curriculum objectives” (IFA, 2017). Knight (2013) proffers that it is an ‘inspirational process that offers children, young people and adults regular opportunities to achieve and develop confidence and self-esteem through hands on learning experiences in a woodland environment” (p.5). In recent years, Forest Schools have spread from their Scandinavian origins to Europe, Asia, Canada and Australasia (Knight, 2016), further adding to a growing demand for Inquiry-based and experiential approaches to learning. While the Forest School approach is different to an IBL approach, they are another example showing a shift away from didactic philosophies in education, especially from the latter half of the twentieth century.

What are the perceived benefits of IBL?

Proponents of inquiry point to several perceived benefits of IBL. Chiarotto (2011) calls for educators to “take the leap” to IBL and outlines several key benefits: more motivated, engaged students with improved understanding as there is self-direction in the learning process; students learn how to develop critical thinking skills and deep thinking; and, inquiry will help develop life-long learning skills that extend beyond “content-mastery” (2011, p. 9).

Short (2009) contends that inquiry “has no other place to begin than in learners’ own experiences and current understandings” (p. 13). By focusing on areas or topics in a way that allows learners to make connections leaves them more likely to develop a deeper understanding and less likely to forget what they have learned because they are isolated or disconnected from it.

Learning through inquiry can give participants a sense of ownership of their work leading to them being happier about their learning experience (Chiarotto, 2011; Pike, 2015). In a world where information is easily accessible, required skills relate to accessing and analysing information, rather than the traditional methods of content learning. This is “what inquiry is all about” (Murdoch, 2015, p. 15).

Inquiry-Based Learning – criticism & challenges.

IBL as an educational stance is not without its critics. Seery (2015a) questions why we prevail with an IBL approach when educational scores in China proved 30% higher using traditional, whole class teaching methods. Kirschner (2006) outlines the failure of constructivist styles of learning including “discovery learning”, “problem-based learning”, “inquiry learning” and “experiential learning” which he suggests all belong under the umbrella of “minimally guided teaching instruction” (p.75). He outlines difficulties with this approach include excessive demands on learners’ working memory and that students may “acquire misconceptions or incomplete or disorganized knowledge” (p.84). Whilst there may be merit in Kirschner’s research in terms of minimal-guidance versus guided-instruction, there is a fundamental flaw in grouping each of the constructivist styles of learning under the one umbrella and assuming that they each follow a minimal-guidance instructional style. Proponents of constructivist learning styles often stress the need for quality guidance and pedagogical expertise, but in a more facilitative rather than instructional manner (Short 1999, 2009; Murdoch, 2015; Seery, 2015b). Seery (2015b) asserts that while an inquiry process may appear unguided from a student’s perspective, a well-versed teacher will be surveying and supporting their learning during the process. Murdoch (2015) points to conservative criticism of inquiry saying that “historically, inquiry learning has suffered from a bit of an image problem” with critics asserting that this is an approach “lacking in structure, depth and clarity” as well as focusing on the “process at the expense of content” (p. 14). Murdoch

contends that simplistic views of learning through inquiry are “frustrating at best and divisive at worst” (p. 14) and elucidates how an inquiry learning student is “continually challenged by the teacher, and tasks are designed to prompt students to question, predict, gather, analyse, synthesize and reflect” (p. 15).

Pozuelos, Travé González, & Cañal de León (2010) outline barriers to using an IBL approach experienced by teachers in two Spanish schools including: misconceptions about what IBL is; difficulties associated with designing teaching units; difficulties in changing to a new teaching approach; difficulties in managing time and curricular instruction, and a lack of specific support materials from the educational authorities. The authors also found notable differences between participants who had marginal levels of professional development and those with a greater measure of professional development. Those with less professional development were found to be more likely to reject an IBL approach. A teacher with high levels of professional development would be seen as more likely to organise and participate in “the research activities in class, and also adopts a researching attitude when it comes to designing and putting into effect the inquiry units” (p. 140).

A number of researchers have attempted to challenge criticism of inquiry as a stance (Quigley et al, 2011; Partaray-Ching & Roberson, 2002; Banchi & Bell, 2008). Partaray-Ching & Roberson (2002) outline nine common misconceptions of IBL by illustrating examples of classroom-based qualitative studies in order to “close the perceived distance between theories of inquiry and actual teaching practice”. Murdoch (2015) contends that quality inquiry classrooms are in operation throughout the world and stresses that for quality inquiry, “content is vital” to challenge students to “engage with significant conceptual understanding of their world” (p. 14).

Inquiry in an Irish context.

The Primary Curriculum.

According to the Irish Primary Curriculum (1999), the stimulus for learning is:

The child's sense of wonder at the complexity of the world, the desire to understand it, and the spontaneous impetus to explore it through play... It is in cultivating the sense of wonder that the curriculum can provide the most fulfilling learning experience for the child and foster an appreciation of the value of learning (NCCA, 1999, p. 14).

At the time of writing, the National Council for Curriculum and Assessment (NCCA) in Ireland was in the process of research and consultation in preparation for the development of a new curriculum. Volante (2018) outlines that the Department of Education will need to provide exemplars that illustrate various sought-after approaches in tandem with a sociocultural focus including “best-practice examples that were derived from playbased/child-centred, cooperative learning, and/or inquiry-based teaching approaches” (p.15). Whilst the NCCA quote above may suggest that the 1999 curriculum should complement an Inquiry-based approach, the heavy content base may be a deterrent.

Gleeson (2010) traces the history of Irish education from 1800 to the modern day, and notes an emergence of fragmented, subject driven curricula in the latter stages of the 20th century. This has led to the emergence of curriculum congestion or overload. This version of curriculum, presented as “an anthology of subjects” (p.95), is to the detriment of the overall curriculum. Several researchers echo the findings that the primary school curriculum in Ireland is overloaded (Walsh, 2016; NCCA, 2010; Coolahan, 2003).

One possible solution to curricular overload is cross-curricular integration (Hayes, 2010). Bacon (2018) proposes that a more integrated curriculum, focusing on a trans-

disciplinary approach, would be appropriate and suggests that the IBL stance as advocated by Kath Murdoch, would enable the facilitation of such.

Science – a natural fit for IBL?

One subject area where inquiry as an approach is to the forefront in Irish Primary Education is Science, where a number of organisations promote an Inquiry-based approach in Science, Technology, Engineering and Maths (STEM), including the Science Foundation Ireland (SFI), the RDS STEM Project and the Centre for the Advancement of STEM Teaching and Learning (CASTeL). The Department of Education and Skills (DES) outlines its vision for STEM education in Ireland up to 2026, “ by 2026, Ireland will be internationally recognised as providing the highest quality STEM education experience for learners that nurtures curiosity, inquiry, problem-solving, creativity, ethical behaviour, confidence, and persistence, along with the excitement of collaborative innovation” (DES, 2017, p. 12). The report outlines key areas for improvement in STEM education in order for Ireland to reach and/ or exceed a standard of excellence, including: to increase engagement and participation in STEM subjects for all learners; to enhance early years practitioner and teacher capacity in STEM; to support STEM education practice and to use evidence to support STEM education.

The 2015 government report *Strategy for Science, Technology and Innovation 2015-2020* (Government of Ireland, 2015) recognise that in order to nurture a strong knowledge economy the right mix of skills and knowledge is essential. They contend that innovative modes of teaching and learning including Inquiry-based approaches will be seen in the coming years.

In contrast to the ideals of the above government strategy Murphy, Varley, & Veale (2012) outline weaknesses in practice observed in fifteen Irish primary classrooms. Whilst the children in the study generally had a positive outlook towards science, it was often taught infrequently and when there were active lessons, they were almost unanimously teacher led.

The authors found that children had very positive attitudes to science in school and had some experience of engaging in “hands-on inquiry in science” (p.415). However, while this type of approach had a much greater appeal to children, some had limited exposure to it and others had none at all. In terms of an inquiry-based approach, the case-study showed that in 11 of 15 observed lessons, pupils were engaged in hands-on activities that were essentially directed by the teacher and only in 1 of the 15 lessons were pupils able to lead their own inquiries. The authors recommend that a long-term comprehensive professional development program for teachers be provided in order for teachers to develop “the confidence and competence to implement the more innovative inquiry-based approaches outlined in the primary curriculum.” (Murphy, Varley, & Veale, 2012, p.433).

Aistear and the early years.

Aistear, the early childhood curriculum framework in Ireland, was developed following a national forum on early childhood education held in 1998 in Ireland, where the absence of an early-years curriculum outside of the primary education was one of the key concerns raised (Daly & Forster, 2009). Aistear is a play-based curriculum, centred on 12 principles of learning and development in the early years (NCCA, 2009). Many of these principles share common threads with the principles of IBL, namely that children learn best when they:

- Have quality interactions with peers and adults.
- Engage in active learning experiences using objects and materials.
- Use their experience to explore and develop hypotheses about “how the world works and think about how and why they learn things” (NCCA, 2009, p.44).

In terms of Irish Educational development, the Aistear program is still in its infancy and not without its flaws. Neylon (2014) points to barriers in the application of the Aistear framework across the early years setting in Ireland. The study of 26 pre-schools indicate “a minimal

standard in the provision of literacy and maths” and “the provision in science and environment and diversity are inadequate” (p. 114). Several reasons for poor outcomes are suggested, including financial cutbacks, high adult: pupil ratios, the provision of outdoor space not a requirement and the need for independent inspection to be applied. Gray & Ryan (2016) suggest that, in spite of the introduction of the Aistear framework, instructional teaching approaches remain dominant and suggest the pressures of conforming to two curricula as well as a lack of teacher training and knowledge needed in order to achieve the aims and objectives of Aistear. Both studies call for more training and resources to be provided for Aistear to be successful. The Department of Education & Skills (2017) highlight an Inquiry-based approach as one of the key criteria for educators in schools: “Teachers and early years practitioners will adopt an inquiry-oriented approach to their teaching and learning, and their practice will be informed by their engagement in and with relevant research” (p. 15).

Outdoor Education

Introduction.

Outdoor Education is a field gathering increasing attention in recent years with many researchers attributing this re-emergence of a once customary educational activity to a decline in children’s connection to the natural world (O’ Brien & Murray, 2006; Beames, Higgins & Nicol, 2012; Joyce, R, 2012). Conventions and understanding around what Outdoor Education is defined as is inconsistent and fragmented (Dyment & Potter, 2014). Joyce (2012) dismisses the idea that Outdoor Education is an innovative concept and charts the history of outdoor education from the 1500s to the modern era. She points to an absence of history and social context in much of the literature on Outdoor Education. Much like IBL there can be multiple interpretations of “Outdoor Learning” or “Outdoor Education” across academic fields, leading to a “conceptual confusion” (Thorburn & Allison, 2010, p.98) so it

will be useful to define Outdoor Education as it will be applied over the course of this research.

For the purpose of this research, Outdoor Education will be understood as educational activities that take place in the outdoor environment for the purpose of curricular learning.

Benefits of Outdoor Education.

In order for young learners to make real connections to the world around them, they need direct experience of the outdoor environment. Expecting students to connect with the natural world is futile if “we confine them, and our teaching approaches, to the prescribed boundaries of classroom walls, worksheets, and textbooks” (Chiarotto, 2011, p.37).

Gardner (1983) highlights the ability of outdoor learning to appeal to a range of learning styles and needs. Using the outdoor environment gives learners opportunities to make meaning and develop understanding through inquiry and real-world experience adding increased value to learning that ordinarily takes place in the classroom (Witt, 2016; Dillon, 2013). Boyle *et al* (2007) have related the enjoyment learners take from practicing geography, geology and environmental science outdoors to an enriched engagement and deeper understanding.

Improved health has also been associated with outdoor education. One of the direct benefits is increased environmental awareness and love of the natural world (Kelly & Potter, 2011; Sobel, 1996). Studies by Glenn (2000) show links to outdoor learning and increased performance in reading, mathematics, science and social studies as well as a greater motivation for studying science. Connections between positive mental health and exposure to the natural environment are also evident in the literature on Outdoor Education. Dillon (2013) notes that exposure to the natural environment has been shown to “lower the effects of various mental health issues that can make it difficult for students to pay attention in the classroom” and that “hands-on contact with nature is not only essential for protecting the

environment but appears to be a means of cultivating community and enhancing the mental health and well-being of children and adults alike” (Dillon, 2013, p. 160).

According to Rickinson et al. (2004) there are four areas in which outdoor learning affects the learner: cognitive, affective; social/inter-personal; and physical behavioural. In their findings, they assert that properly planned and implemented outdoor learning offers participants the opportunity to “develop their knowledge and skills in ways that adds value to their everyday experiences in the classroom”. Barlow (2016) conducted a case-study teaching local history and geography using a school’s local environment. He suggests that whilst changes in curricula calling for children to study faraway people and places is necessary, meaningful connections to the wider world can only be made through the lens of the local environment.

Barriers to outdoor education.

Waite (2010) asserts that primary schools are using the outdoor environment less than in the past and calls for this to be reversed. Several researchers point to a disconnect between curricula that call for an understanding and appreciation of the natural environment and children who are becoming more distanced from nature (Sobel, 1996; Pyle, 2010; Louv, 2005).

Dillon (2013) outlines barriers to implementing Learning in the Natural Environment (LINE) including increased cost, accident risk, curriculum load and teachers’ reservations. He calls for the natural environment sector to “take action to provide schools with a compelling rationale” for learning in the outdoor setting (p. 164). Dickie, Ozdermiroglu & Phang (2011) argue that while implementing LINE as a policy measure may incur a small overall investment cost, its value to society would provide exponential savings by reducing societal costs associated with poor health, antisocial behaviours and lack of educational achievement.

Beedie (1999) notes a lack of incentive for teachers if the justification for Outdoor Education isn't made explicit. He points to confusion between Outdoor Education, as any learning that takes place outdoors, and Outdoor and Adventurous Education, associated more with physical education. Lemmey (1999) highlights a public perception amongst education stakeholders that Outdoor Education can be "dangerous" (p.36) and, like Beedie, links this to the assertion that Outdoor Education is often mistaken for Outdoor and Adventurous Education.

Outside of education there is also evidence that children today spend less time outside than their parents would have done at their age. Some of the reasons attributed by Bilton (2010) include parental fear of the dangers of playing outside, preoccupation with technology and video games and over-reliance on vehicular transport.

Outdoor education in Ireland.

The 1999 Irish Primary Curriculum notes the significance of exploring the local environment of a school, particularly in the area of SESE:

One of the most important aspects of the geography curriculum and the wider SESE programme is the emphasis placed on the exploration of the local environment of the child and school. The planning process should involve teachers in becoming familiar with the locality of the school, the people and communities in the area and the human and natural geographical features to be found there (NCCA, 1999, p.26)

Teachers are encouraged to engage with local agencies, libraries, museums and heritage and cultural centres to form a partnership in facilitating learning (NCCA, 1999).

In spite of a curriculum which supports experiential learning, Dolan, Waldron, Pike & Greenwood (2014) show that while student-teachers value geography, independent work and fieldwork, geography classrooms in the Republic of Ireland are dominated by practises such as "rote learning of textbooks, notes and lists of physical features" (p.321).

Pike (2015) points to an imbalance in the interpretation of the geography curriculum with inconsistency between some schools where children are inquirers and are active agents in their learning, and other schools where the focus is on content and where “children’s roles and activity in geography are sidelined” (p.194). Pike notes further that learners are “very positive” in schools where IBL approaches are central to teaching geography (p. 194).

Madden’s (2019) extensive research, exploring the decline in Nature Education in Ireland in recent years, finds multiple factors for this decline, including limited teacher confidence, a reliance on digital technology and a lack of biodiversity in school grounds. He calls for a more holistic approach to Nature Education, to be integrated across the primary curriculum. He advocates a return to the learning in the outdoor environment, as was commonplace in the past, to help improve student health and wellness, conservation awareness and general nature literacy.

Affordance – using the outdoors for IBL.

Affordance Theory, first rationalised by Gibson (1986), is the idea that the possibility for action is provided to an individual by an environment. He describes the term, coming from the verb “afford” as what an environment “offers the animal, what it provides or furnishes, either for good or ill” (p. 127). In academic fields there is a growing movement towards recognising the importance of utilising the affordances of the local environment in education, particularly in History and Geography (Hope, 2009; Dillon, 2013; Barlow 2016). The sense of open-endedness associated with Outdoor Education is appealing for children and can be used by teachers to help engage students in an inquiry (Barrable, A. & Alexios, A., 2019). In their research they describe affordance (as an educational construct) as the “properties of a place, which in relation to the child’s abilities can enhance learning potential” (p.45).

A potential difficulty with encapsulating Outdoor Education and the affordance of the outdoor environment may well be that it is so vast and varied. Whereas in all classrooms we may imagine the same things: four walls, desks, chairs and a whiteboard; in outdoor learning we are dependent on the affordances of the particular area in which learning takes place. On the other hand, it should be remembered that the Primary SESE curriculum allows for this – it calls for teachers to get to know a school's local environment and plan to utilise it in covering the primary SESE curriculum (NCCA, 1999).

Outdoor Education, instead of competing for curricular time, can be used as a vehicle for curriculum. Chiarotto (2011) calls for educators to utilise an Inquiry-based approach in the outdoor environment in order to help shape socially and environmentally conscientious citizens. “A class’ outdoor experience may be the spark that ignites their curiosity, leading to questions that set the wheels of Inquiry-Based Learning in motion” (p.4).

Inquiry Cycles

Introduction.

Many authors in the literature use inquiry cycles are commonly used to describe the process of inquiry (Short & Harste, 1996; Murdoch, 2019; Justice *et al*, 2002). There are many versions of a 'cycle of inquiry' (Pedestea *et al*, 2015; Bell, Urhahne, Schanze, & Ploetzner, 2009) therefore, according to Murdoch (2015), “it is well worth exploring several in order to help you deepen and broaden your thinking about the approach” (p.76).

In order to provide clear guidance for what outdoor IBL is, in the context of this research, several cycles of inquiry are examined in this section. At the end of the section, the Framework for Outdoor Inquiry (*Fig. 7*) is presented, mapping out the key stages in an outdoor unit of inquiry. The cycles of inquiry chosen for analysis represent those which have key elements which will help to guide this research and develop a new inquiry cycle for outdoor IBL, the Framework for Outdoor Inquiry (*Fig. 7*).

While there are multiple versions of an inquiry cycle, there isn't a universal, agreed upon depiction of what an inquiry cycle should look like or how the process of inquiry should proceed. Researchers have noted common threads across many different inquiry cycles, with a common process illustrated at the core (Stripling 2003; Short Short, & Burke, 1996). Pedaste *et al* (2015) conducted a systematic literature review in order to simplify the inquiry process and combine the strength of 32 different IBL frameworks. Their analysis concludes that there are five distinct general inquiry phases common to most inquiry cycles, which they classify as: Orientation, Conceptualization, Investigation, Conclusion, and Discussion. The authors note that these phases capture commonalities across various models of inquiry cycles, whilst acknowledging that each model or framework still has its own intricacies and nuances, and often is designed for a particular area of research. At this point in the research, several inquiry cycles will be analysed, with a view to developing a refined model of inquiry, specifically to help guide the inquiry process for this research.

Model 1: The Authoring Cycle (Short & Harste, 1996)

In a webinar interview, Short (2017) describes the Authoring Cycle (Figure 1) explaining that connection to the child's own knowledge and experience (Connection) is key to developing a deeper conceptual understanding. The inquiry process begins through an invitation to finding out more (Invitation) with children developing a compelling need or want to know (Tension) linked to their own connection(s). This leads to the Investigation and Demonstration, a collaborative phase led by children where the teacher's role is as a facilitator, observing the inquiries and reminding the children of their original goal/ concept (Revision). Toward the end of an inquiry process learners choose how to present their findings (Representation), showing what they have discovered which has value (Valuation),

how this might affect their conceptual understanding and what this means going forward (Action).

Short & Harste's (1996) model allows for fluidity in an inquiry process with double arrows between each stage (Figure 1). Short (1999) explains why the original "Authoring Cycle" was edited to include the double arrows: "The arrows in the cycle go both ways, indicating that there is a continual movement back and forth between the different aspects of the inquiry process, rather than a specific sequence or hierarchical order" (p. 17).



Figure 1 - The Authoring Cycle.

Model 2: An Inquiry Cycle for Students (Murdoch, 2015)

Murdoch (2015) uses single arrows to show the direction of the stages of an inquiry cycle from "Tuning In" to "Evaluating. The central circle represents the general competencies often necessary of learners in an inquiry: thinking, collaborating, self-managing, researching and communicating (Figure 2). Murdoch asserts that the use of a

framework can be useful for the teacher and learner alike in order to move beyond simply coming up with activities to developing and fostering a deeper knowledge and understanding during the course of an inquiry. Unlike Short & Harste's (1996) model, Murdoch's inquiry cycle is expressly designed to be used by the learner.

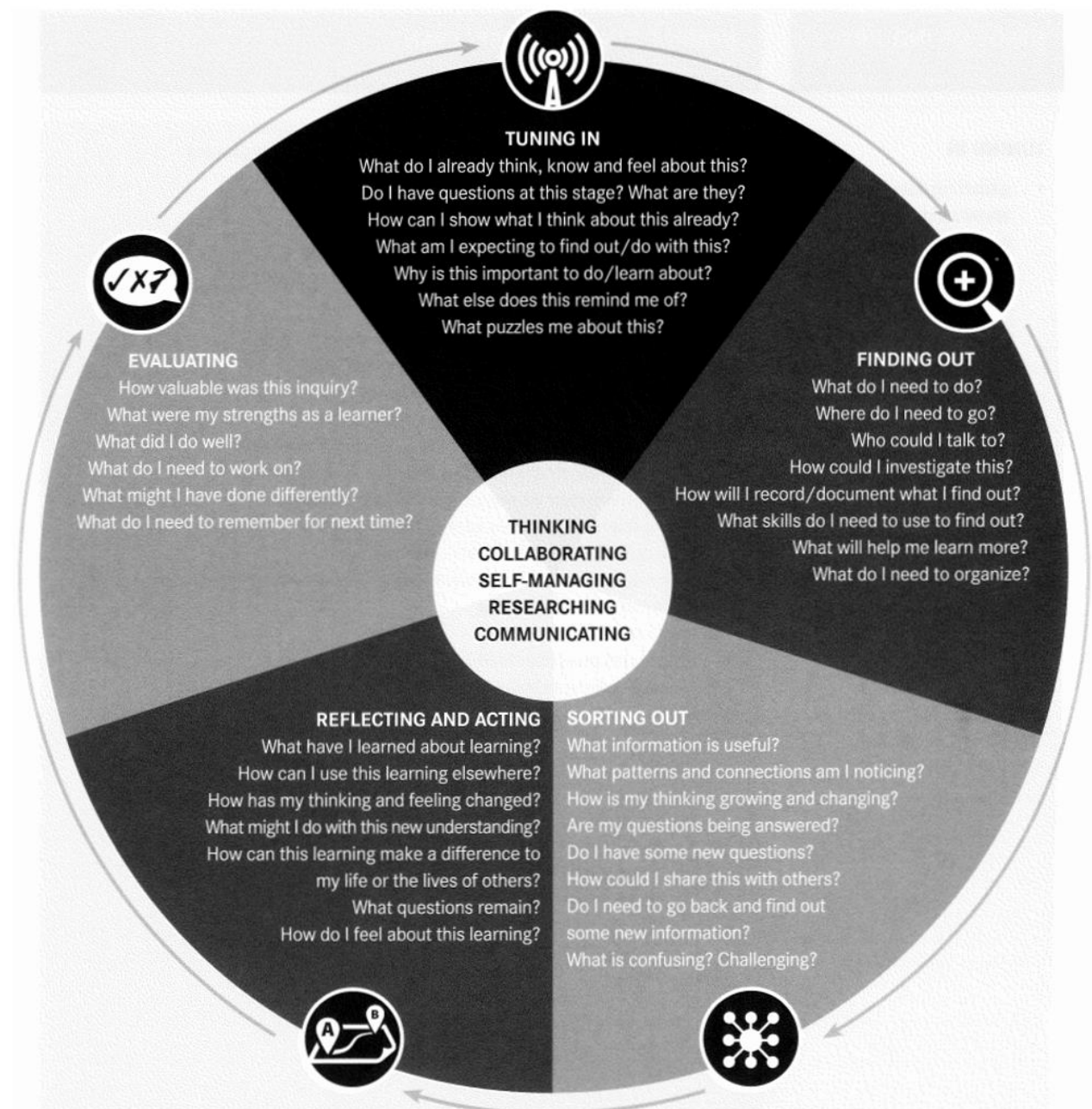


Figure 2 - An Inquiry Cycle for Students

As Pedaste *et al* (2015, p.51) assert, generally most inquiry cycles could be compartmentalised into five general phases: Orientation, Conceptualization, Investigation,

Conclusion, and Discussion. This is particularly evident in Murdoch’s model, which clearly illustrates five distinct phases of inquiry. The five phases are less distinct in Short & Harste’s Authoring Cycle (Figure 1), which allows for more fluid transitions between phases including reverting to a previous phase. Murdoch (2015) acknowledges that representing an inquiry cycle in a 2D framework is challenging, since inquiry “is fluid, sometimes messy and complex” (2015, p.76).

Model 3: Inquiry Cycle (Justice et al)



Figure 3 - Inquiry Cycle (Justice et al).

Justice *et al* (2002) also use single direction arrows to reflect a staged approach to the inquiry process, with a central precept of “self-reflection and self-evaluation” (p.5). The authors contend that this central precept encourages learner self-awareness and is necessary throughout all stages of the inquiry process (Figure 3). The use of single direction arrows gives a clear sense of direction and order that an inquiry should take but, as with Murdoch’s model, it does not show a route for revision or going backwards between stages in an inquiry process. As with the Authoring Cycle, one element is shown outside of the circle, a key

ingredient for engaging learners. For Shorte & Harste (1996) this essential component is the child’s own connection to the “Big Idea” (Short, 2017) while for Justice *et al* (2002), the necessary component is “Taking Responsibility for Learning” (Figure 3). Once learners are responsible for their own learning they can then begin “engaging in a topic and developing basic knowledge” (Figure 3). Similar to Short & Harste’s invitation phase, this needs to be “contextualized in a topical content that engages students and allows them room to find personal significance” (Justice et al, 2002, p.4).

Model 4: The Process of Inquiry (Wolk, 2008)



Figure 4- The Process of Inquiry.

Wolk (2008) proposes a model instead of inquiry with multi-directional as well as linear arrows to represent the process of inquiry, asserting that inquiry can be a “messy process” and at times “idiosyncratic” (p. 118). In his analysis he asserts that his own diagram is overly simplified in that it doesn’t take account of a teacher’s role in planning the inquiry

and having an awareness of the key concepts or “big ideas” and how to facilitate meaningful inquiry by students (p. 118). Wolk’s cycle (*Fig. 4*) uses the words at the centre of the cycle to depict how a facilitator fulfils an essential role during the inquiry process: ensuring the participants are continually reflecting, questioning and rethinking.

Model 5: The Structure of Knowledge and the Structure of Process (Erickson & Lanning, 2014)

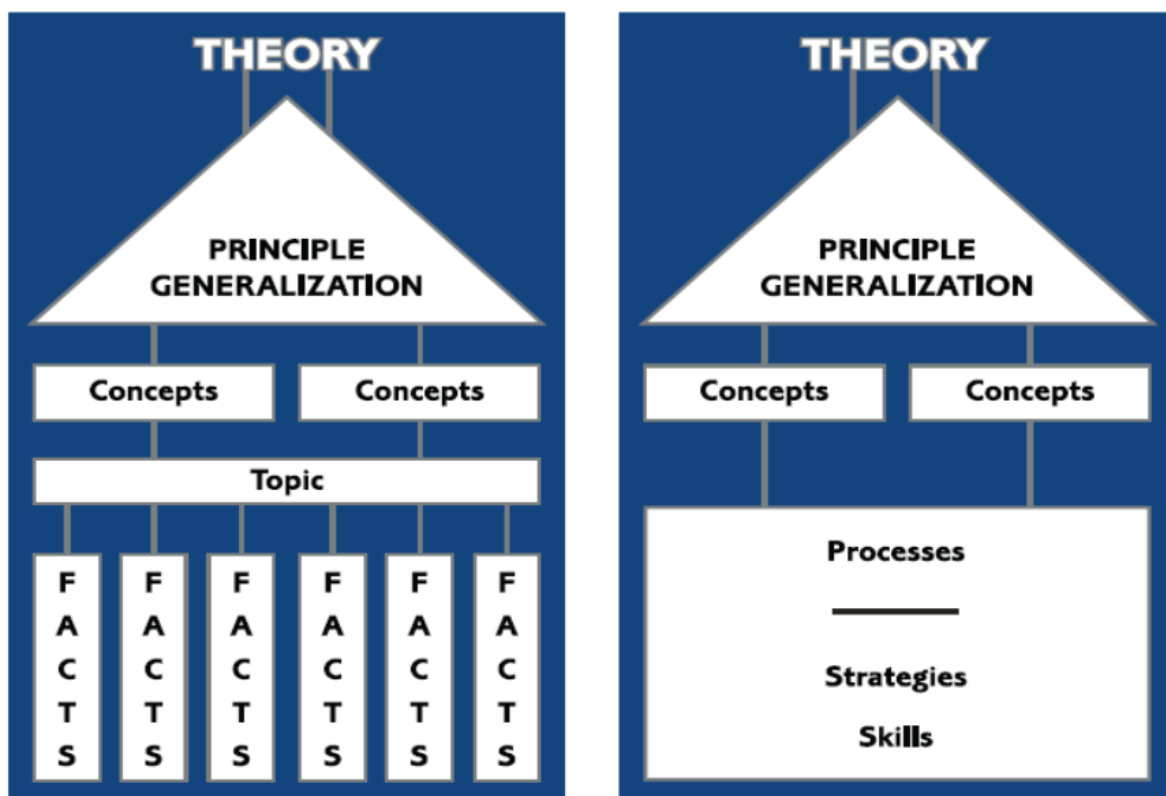


Figure 5- The Structure of Knowledge and Structure of Process.

The Structure of Knowledge and Structure of Process (*Fig. 5*), utilise straightforward “house-shaped” diagrams to show that conceptual understanding is constructed from the bottom up by using a foundation of real-life facts, (Figure 5). Facts refer to concrete examples or real-life knowledge but are separate from “conceptual understanding” as conceptual understanding allows transferring of knowledge and skills whereas “facts” do not (Stern, Mohnkern, & Ferraro, 2017, p. 15).

Erickson shows that a deep understanding occurs when there is a symbiotic relationship between two or more concepts within a certain subject area and real-life experience or factual knowledge. A high importance is placed on selecting key content to support deeper conceptual understanding which are referred to as Generalisations and Principles The Structure of Process, shown in the right in *fig. 5* was developed by Lanning to complement the Structure of Knowledge on the left. It shows that in process driven areas of learning, including World Languages and the Arts, processes, strategies and skills are used. Essentially, learners' successful understanding of key concepts is grounded in what they are able to do instead of what they know or have experienced (Erickson & Lanning, 2014).

Model 6: The Stripling Model of Inquiry.

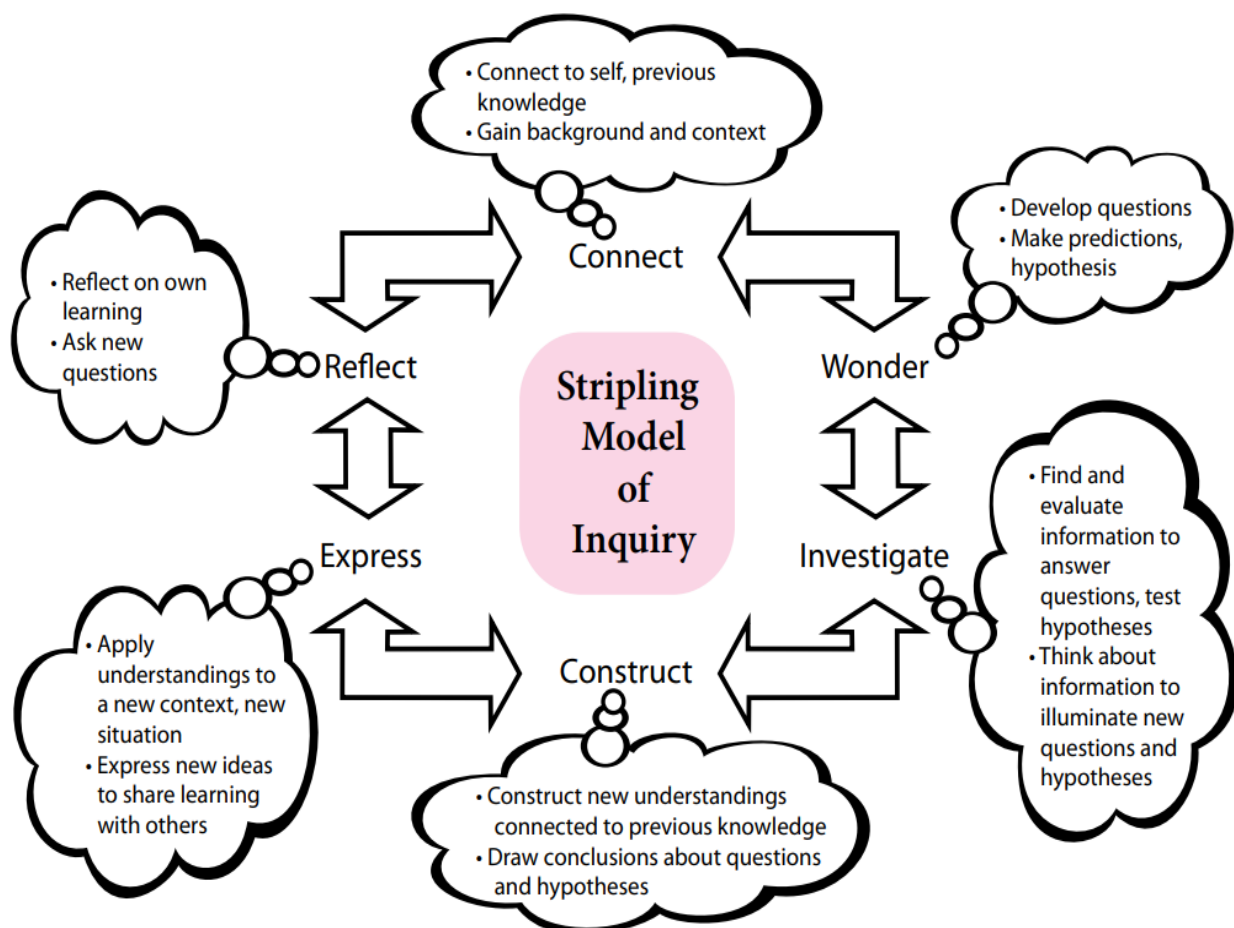


Figure 6 - The Stripling Model of Inquiry.

The final model of inquiry chosen for consideration is the Stripling Model of Inquiry. This model includes six stages: Connect, Wonder, Investigate, Construct, Express, and Reflect and shares similarities with many of the previous depictions of an Inquiry process.

Similar to the Authoring Cycle (Figure 1), connection to self and the wider world is key in the Connect phase (figure 6). Whilst Stripling shows this phase within the cycle of inquiry, rather than outside of it, it mirrors Short's (2017) assertion that all inquiry begins with a learner's initial connection. Also similar to the Authoring Cycle is the iterative design of the model, which allows participants to go back and forth between the phases of inquiry to resolve new uncertainties and complications as they arise (Stripling, 2010).

Putting it all Together – Developing a Framework for Outdoor Inquiry

The framework was designed, incorporating some of the key strengths of the cycles studied in the previous section and is intended to be used by educators and/or learners in an outdoor cycle of inquiry.

Having explored five different models of inquiry and the Structure of Knowledge and Structure of Process (Figure 5), a number of common threads emerged which I have drawn from to develop a meaningful model of inquiry for the purpose of this research. The Framework for Outdoor Inquiry (*Fig.7*), shows the path an inquiry will follow, a staged approach, with three key phases: Curiosity, Exploration and Evaluation. Each phase is divided into sub-phases, with double arrows showing that inquiry won't always follow a linear path for learners, and that making revisions, going backwards, revisiting assumptions and finding new information can be commonplace in IBL.

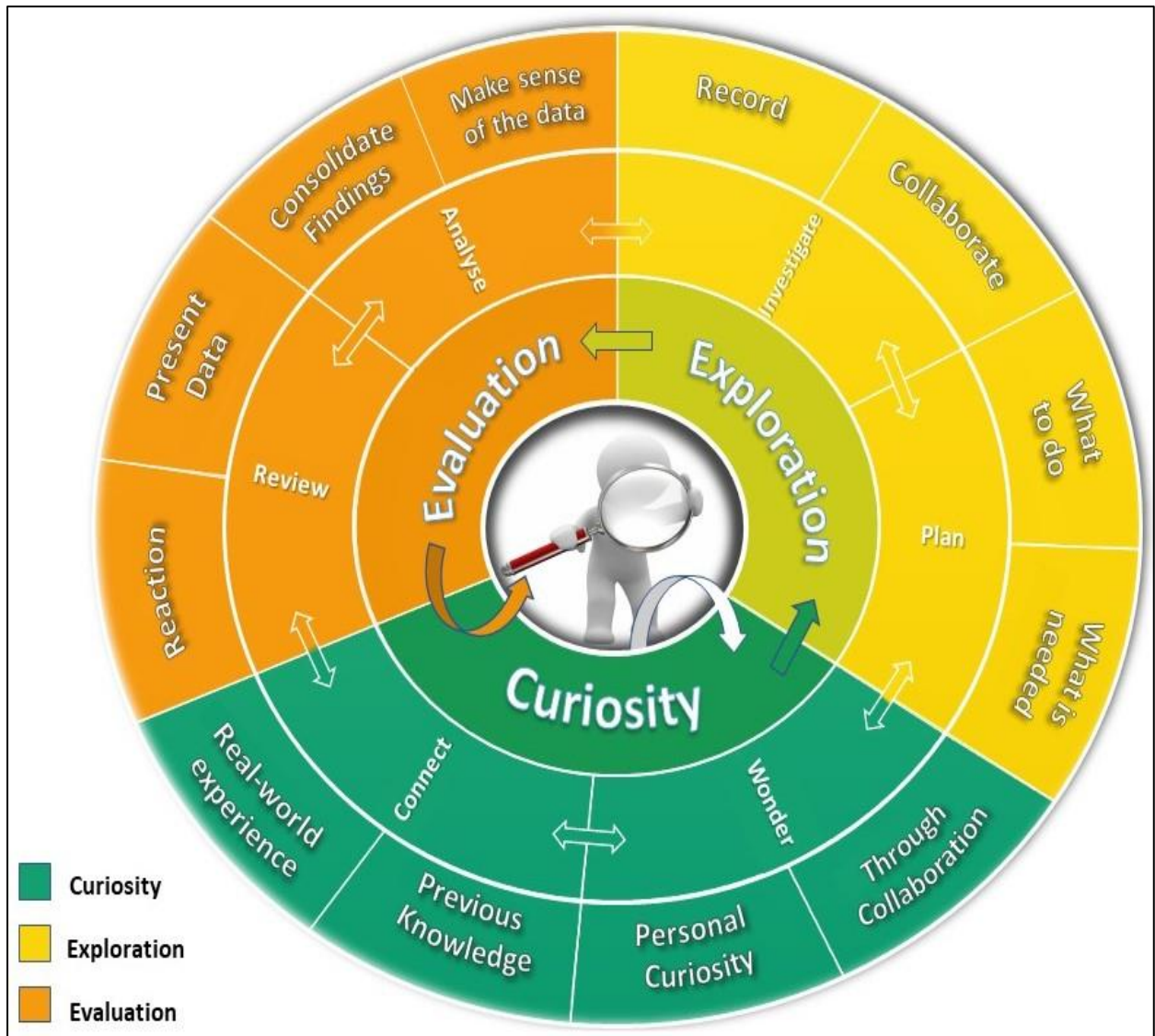


Figure 7- A Framework for Outdoor Inquiry.

Curiosity.

A key feature of inquiry cycles is that they usually begin with a hook or connection, a need to know that draws in the learner and allows him/her to be an active participant in the process (Short, 2017; Stripling, 2003). The Framework for Outdoor Inquiry shows how the learner, represented by the character in the centre, is invited into an inquiry through a natural curiosity, brought on by connections from their own real-world experiences and previous knowledge. A facilitator or teacher may have planned an inquiry around certain concepts and themes but it is the connections that learners make to their own lives and understanding of the world that will engage and motivate their learning (Short, 2009; Murdoch, 2015; Justice *et al*,

2002). Within this phase, a keen interest is stimulated by connections to real world experience and/or previous knowledge which lead participants to wonderings about a particular topic prompted by their own and/or group thinking. Of the previous cycles this phase is most similar to Short & Harste's "Connection" and "Invitation" phases (*Fig. 1*) or Stripling's "Connect" phase (*Fig. 6*).

Exploration.

This initial curiosity leads to the "Exploration phase", which includes the two sub-phases of "Planning" and "Investigating". Learners plan what resources they will need and how they will go about finding out information, for example: will they conduct a field study, will they interview people, will they use secondary sources (books, the internet, photographs, reports, etc.)? They may record this using mind-maps and/or lists to plan and structure their work, and this will often be a collaborative process. The teacher's role is to guide the learners and at this stage they will begin to plan and gather necessary resources. When they are ready, they begin putting their plan into action, through engaging with the environment, making observations and recordings as they do. At this stage (*Investigate, Fig. 7*), learners are actively engaging with their environment, with their initial interests and curiosity at the fore. A key component at this stage is recording the process and key information which may affect findings. How data is recorded in a modern cycle of IBL can vary hugely, with an ever-increasing abundance of supportive technological tools for recording educational experiences such as Seesaw, Flipgrid and Anchor as well as traditional recording instruments like sketches, written notes and photographs. Should the Exploration phase lead to significant findings, the inquiry will proceed to the "Evaluation" phase. Learners at this stage may also choose to go back and revise or redraft their planning on account of the new information.

Evaluation.

This phase involves an initial sub-phase of “Analysis”: consolidating the data gathered and making sense of what it means. The learner gets ready to share their findings and decides how they might best present them to others. This data is then presented to others during the “Review” phase and may include visual or audio-visual aids (e.g. Posters, photographs, Powerpoint, videos). This may lead to new questions and wonderings as learners interact with their audience and they then can decide if there is more to do or if they are satisfied with the outcome of their inquiry. The teacher’s role here is to facilitate the review of the inquiry to date in a collaborative, reflective environment, asking questions and prompting the learner (and audience) to critically reflect on their findings. This leads to the final stage of Reaction (*Fig. 7*), where the learner decides what should be done next. This stage may prompt the learner to take action based on the findings of their inquiry, open up interest areas for a follow up inquiry, or lead to them deciding to revise and rework elements of their original inquiry.

Aim of this framework.

As there are an abundance of models of inquiry cycles, it would have been easy to choose an existing one to act as a blueprint, or guide, for this study. However, it was determined that a framework could be developed that would clearly lay out what an inquiry cycle looks like, with a simple to follow model that could be followed by educators with a background knowledge of IBL, educators without a background knowledge of IBL and also the learners who would engage in a cycle of inquiry. The aim of the framework is to provide a guide to provide clarity and direction during a course of inquiry. Due to the unexpected Covid-19 pandemic, the framework proved to have an unintended additional function – guiding children and parents to finish their cycles of inquiry from their home and local environment.

Conclusion

In this chapter, I have explored the literature in relation to the key themes of the research: Inquiry-Based Learning (IBL) and Outdoor Education. The history of IBL was traced from its roots in ancient times, through the development of constructivist approaches in education, into its current trans-disciplinary state where its definition can vary depending on the nature of the field. For the purpose of this research, IBL was defined, whilst its current role in Irish education and link to perceiver “learner centric” schools was explored. Criticisms of IBL were presented, as well as criticism in how it can be perceived and criticism of its application. The response to criticism was also explored. A number of models were then examined, for the purpose of exploring the process of inquiry. A new model, “The Framework for Outdoor Inquiry” was developed with the aim of visually representing the inquiry process, particularly for the purpose of this study. The second theme of this study, Outdoor Education, was analysed. Similar to IBL, the field of Outdoor Education has experienced some ambiguity in its definition and is sometimes confused with other fields of outdoor activity. For the purpose of this study, Outdoor Education was defined and the benefits and barriers to Outdoor Education were explored. Outdoor Education in the Irish education shows inconsistent, with an SESE curriculum calling for the use of the local outdoor environment with some schools overly reliant on content and limiting children’s participation in outdoor education. Finally, Gibson’s theory of Affordance (1986) was analysed, with a view of Outdoor Education being presented as a vehicle for curriculum rather than the curriculum itself.

Chapter 3: Methodology

Introduction

This function of this chapter is to identify and evaluate what was decided to be the most suitable methodologies in order to best generate data that will answer the research questions for this study. In order to do this, I begin by restating the research questions which were outlined in the previous chapter and give a brief overview of the background to the study, including the setting and the chosen population sample. I then outline philosophical foundations underpinning the research; the qualitative approach chosen (methodology); data generation and pilot study; ethical considerations and validity and reliability of the research. This section finishes with an analysis of possible limitations of this research.

The research questions.

The first question when choosing the most suitable methodology is not “which methodology?” but “what do I need to know and why?” (Bell, 2014, p119). It would be useful therefore to return to the research questions:

- Can the outdoor environment of a school provide a good stimulus for Inquiry-Based Learning (IBL)?
- Does engaging in a cycle of IBL impact upon student learning and how?

These questions were central during the process of choosing the most suitable methodology for this research.

The context of the study.

As outlined in the previous chapter, a number of perceived benefits are associated with IBL as an educational stance. Proponents of IBL argue that it is a concept-based approach to learning which facilitates greater engagement and a deeper level of knowledge and understanding amongst participants in a learning process. The review of the literature

highlighted a general decline in Outdoor Education as well as an Irish Curriculum that is subject-driven and overloaded. (Walsh, 2016; NCCA, 2010; Coolahan, 2003)

A number of researchers have called for a cross-curricular approach in education (Hayes, 2010; Bacon, 2018) and the Irish primary curriculum was under review by the NCCA at the time of writing (NCCA, 2019). This research may provide evidence that a cross-curricular approach would be valuable for Irish primary education, and that through engaging in outdoor IBL, schools can reduce the impact of curricular overload and facilitate more meaningful learning experiences.

The Setting of the study.

The setting for this study was a recently built school and its local area, located on the outskirts of an Irish town along the eastern seaboard of the country. The school has grown rapidly in recent years and is now close to full capacity, with two of each class level and three smaller classes for children with Autism Spectrum Disorder (ASD). It was a mixed gender school, multi-denominational school with children coming from a wide catchment area.

In the context of this research, the outdoor inquiry began with a trip to a local angling club, which was founded on a disused reservoir. Here, the participants were stimulated by their own connections and interests to the place. They used the Framework for Outdoor Inquiry (*Fig. 7*) to help guide them through the different phases of the inquiry process from the initial Curiosity phase, to Exploration (planning and investigating) and on to the Evaluation phase (analysing and reviewing).

Philosophical Foundations Underpinning the Research

The philosophical approach of a researcher will help to guide the type of research conducted (Saunders, Lewis and Thornhill, 2009). Two core philosophies are positivism and interpretivism. Positivism involves a more scientific approach to research and utilises large-

scale data collection in order to explain and identify patterns. The interpretive approach attempts to gain a deeper and more objective understanding of a concept (Cohen, Manion & Morrison, 2018).

For this study, it was decided that a greater level of detail and personal experience would be more beneficial in gaining an understanding and drawing conclusions on the subject. With this in mind, interpretivism was selected as the more appropriate philosophy.

Research Design - Methodology

When choosing a research approach for a study, the researcher needs to consider the type of information and level of detail required to best answer the research question(s). Possible options include a quantitative, qualitative or mixed-methods approach. When deciding on one of these approaches, the key guiding principle should be a consideration of how suitable the chosen method is given its purpose, and an appreciation from the researcher of the purpose data to be generated for analysis (Cohen et al, 2018).

Why a qualitative method approach?

It was decided that the research questions in this study could best be addressed through interpretation of the personal knowledge and experience of young learners involved in the IBL outdoor project. Therefore, a qualitative approach to data was considered the most appropriate one as a means of addressing the questions. This approach provides the researcher the opportunity for follow up questions and greater discussion, in order to explore and fully understand the responses given.

Whereas quantitative data research methods are related to the number of people undertaking particular behaviours, qualitative data methods can help researchers to understand how and why such behaviours take place (Sutton & Austin, 2015). This approach provides the opportunity to go beyond the analysis of numbers to form a fuller picture (Cohen et al, 2018).

The approach – why a case study?

Within the chosen qualitative data approach, the specifics of the research design need to be mapped out. Creswell & Creswell (2018) recommend that within qualitative research, researchers select from one of the five main qualitative designs: “narrative, phenomenology, ethnography, case study, and grounded theory” (p.301). The case study approach is useful for answering “‘*how*’, ‘*what*’ and ‘*why*’ questions” during naturally occurring events, as opposed to experimental research where an environment is purposely engineered in order to test a specific hypothesis (Crowe *et al*, 2011, p.4). Yin (2014) suggests that case study research is best applied to study phenomenon that occurs organically, where research questions are applied to “some present circumstance”.

The research questions, stated at the beginning of this chapter, can be best answered by exploring how the young learners in the study naturally engage during outdoor IBL lessons. This will involve analysis of *how* they react, *what* they react to and engage with, and *why* they react and engage in a certain way during an outdoor cycle of inquiry. As such, a case study was chosen as the best qualitative design to answer the research questions.

The Population Sample

The chosen sample group had 24 students, ten girls and fourteen boys. One of the students was on a shared timetable between an ASD class and the mainstream class. The participants were 4th Class students, between 9-10 years of age. One class group was chosen as the population sample, instead of two or more, as it would enable a more in-depth, detailed analysis of the children’s experiences during the outdoor inquiry. This reflects the nature of the qualitative approach to data.

The Research Instruments

A qualitative research approach to data tends to see the researcher more actively involved in the data generation process than in a quantitative approach (Denscombe, 2014). Creswell & Cresswell (2018) note that the researcher will usually be immersed in a prolonged experience with participants. They assert that there are “four basic types” of collection procedures which include qualitative observations, qualitative interview, qualitative documents and qualitative audiovisual and digital materials (p. 306). The main instruments in this research were chosen with the aim of generating rich data throughout the outdoor IBL experiences. These are outlined below:

Qualitative observation.

“The use of observation as a principal mode of research has the potential to yield more valid or authentic data than would otherwise be the case with mediated or inferential methods” (Cohen et al, 2018, p.542). As this research is looking to gauge the personal experiences of participants during their outdoor inquiries, qualitative observation was chosen as a key instrument for generating rich data.

Observation can highlight key facets of a learning experience that can be difficult to uncover without experiencing directly (Scott & Morrison, 2007). In this research, observation allowed the researcher to gain real time, first-hand experience of the children’s involvement and engagement during the outdoor inquiry process. Observation notes were kept in a research journal in order to capture key interactions and reactions as they happened.

Semi-structured focus group interviews.

The use of semi-structured focus group interviews was chosen as the most suitable tool to elicit understandings about personal experience and perspectives of use of the natural environment. The key benefits of using interviews are that “they can provide an opportunity or in-depth conversation with respondents (students, teachers, colleagues), they can yield rich

data and are useful for gathering data from students” (Regan & Dillon, 2013). Further, interviews also allow for further questioning or elaboration of any specific areas (Merriam, 2014). Semi-structured focus group interviews were chosen to encourage a natural flow of conversation, with an emphasis on open-ended and objective questions to allow the participants free range to explore and express their views, while allowing for clarification or further exploration of a subject, if necessary. (Bell et al, 2014).

Photographs

As with other research instruments photographs can prove to be an important data source. Denscombe (2014) outlines the value that photographs can add, including: “the factual information they contain” and “how they represent things (the symbolism and hidden meanings communicated through the document or image)” (p.234). Photographs were chosen to add value and attempt to capture, in the moment, rich insights into how children learn and engage with outdoor IBL.

Video interviews.

Originally, I had planned to conduct three focus group interviews during the course of the outdoor inquiries and corresponding ones with the same participants at the end of the inquiry. Due to school closures because of the outbreak of Covid-19, technology was utilised to facilitate feedback from participants at the end of the research. This involved the use of remote interviews using the video conferencing tools Zoom and Microsoft Office Teams. These allowed the participants to discuss their experience of the full cycle inquiry, the early stages in the local area of the school and the latter stages in their own local area.

Work samples.

Children’s written work and drawings can be rich source of data, especially in research that is focused on their educational outcomes (Hall & Wall, 2019). Due to the fact that up to 24 participants were being engaged in the outdoor inquiry at any one point during

this research, I decided that samples of children's work would be useful to help capture their thoughts and experiences in relation to the IBL outdoor studies. This took the form of drawings, worksheets and project work submitted by e-mail and online educational apps including Book Creator² and Flipgrid.³

Pilot study.

A pilot study can guide a researcher in terms of how questions are structured and interpreted while also indicating the researcher's effectiveness as a facilitator of the interview (Breen, 2006). As a researcher, I wanted to find out about the learning experiences of the participants, without influencing or leading their responses in any way.

A pilot focus group interview was conducted with four participants from fourth class. The theme of the interview was around the children's experience of a school "Culture Week". This was chosen as, like this research study, it would involve the children's viewpoints of an educational experience. A semi-structured interview was designed to see if it would be a useful instrument for generating rich data. Following the completion of the pilot focus group interview, the interview was transcribed. I was content with the data generated and felt the semi-structured nature allowed for quality interactions and responses. I was also satisfied with the number of participants involved, as they each had sufficient time to make their own contributions. One note I made for myself as researcher was not to feel a need to fill the silence, as at times I interjected when a silent pause would have allowed the participants more time to ponder and respond to a question.

² **Book Creator** is a tool for creating digital books using text, images, audio and video.

³ **Flipgrid** is a website that allows teachers to create "grids" to facilitate video discussions.

Population sampling.

Probability sampling and non-probability sampling are two types of sampling techniques that can be used for social research. Probability sampling involves “random selection from the research population” (Denscombe, 2014) and is mostly used for quantitative research and large-scale surveys. With probability sampling, the researcher does not have control of the selection of participants to be included in the sample. As this study is concerned with the learning experiences of primary school students, it wasn’t feasible to consider probability sampling. Non-probability sampling was chosen, as it requires that the researcher chooses respondents who are representative of their target population. As this research aims to gather views of young learners in an Irish primary school setting the type of sample chosen was a representative sample.

Inclusion criteria.

My position as teacher within a large school meant it would be possible to conduct this research with more than one cohort of students if necessary. Due to the qualitative nature of the research and the focus on rich learning engagements it was decided to limit the study to just one class. Within that class there were 23 mainstream students and one student who splits his time between the mainstream 4th class and a class setting for children with autism.

Data Gathered

The data for this study was gathered using the research instruments chosen for this study (qualitative observation, focus group interviews, video interviews and work samples). Video interviews were a response to Covid-19 related restrictions and replaced what would have been a second round of focus group interviews. The schedule of the collection of data is illustrated in Table 1 - the Schedule of Data Collection.

Date	Event	Participants	Location	Duration
10/03/2020	Trip to local reservoir	All 24 students	Reservoir, 1.1 km from the school.	2 hours
11/03/2020	Focus Group 1 Interview	Colin, Brian, Anabelle, Mia	Small room in the school	27:05 (min:sec)
11/03/2020	Focus Group 2 Interview	Anna, Mary, Kevin, Shaun	Small room in the school	16:20 (min:sec)
12/03/2020	Tracking the stream	19 students (5 absentees)	Local housing estate, leading to the town and river. 2.2km from school to river.	2 hours
12/03/2020	Focus Group 3 Interview	Patrick, Anna, Colin Marcus	Small room in the school	08:37 (min:sec)
12/03/2020	<i>All schools nationwide closed in response to Covid-19 pandemic</i>			
03/04/2020	Video Interview 1	Hannah & Helen	Video Call via Microsoft Teams	12:14 (min:sec)
03/04/2020	Video Interview 2	Colin & Audrey	Video Call via Zoom	21:41 (min:sec)
03/04/2020	Video Interview 3	Rhys & Annie	Video Call via Zoom	14:32 (min:sec)
04/04/2020	Video Interview 4	Michael & Paul	Video Call via Zoom	25:22 (min:sec)

Table 1 - Schedule of Data Collection.

Data handling.

In order to collect and organise data, NVivo qualitative data analysis software (NVivo 12.6 for Windows) was used. All data generated was uploaded to a new NVivo project, including work samples, audio files and photographs. Once all data was uploaded, it was coded and categorised and a case was created for each participant. The project could only be accessed through a password-protected computer.

Robustness and Validity of the Research

Research reliability refers to the likelihood that the study would provide the same general observations and results, if carried out again (Bell, 2014). In order to ensure reliability, semi-structured interview questions were composed which allowed participants to

express their own views. Each focus group interview was conducted as similarly as possible with a similar physical set-up and with the same semi-structured interview questions for guidance. Data was gathered from multiple sources in order in order to strengthen or triangulate the data. Laws, Harper, Jones & Marcus (2013, p. 143) assert that the a central tenet of triangulation is “to see the same thing from different perspectives and thus to be able to confirm or challenge the findings of one method with those of another”.

In describing the context of the research and its participants, I aimed to give enough details for a clear overview to be given, so that the reader may consider the transferability of the findings.

Validity of research refers to whether the research truly measures that which it set out to do, and the accuracy and honesty of the results (Golafshani, 2003). The validity of the research process was maintained through regular consultation with a research supervisor and an ongoing appreciation and understanding of researcher bias in studies. Honest answers were assured by allowing an opportunity for participants to answer with no addendums or prompts from the interviewer, and interviews were transcribed accurately prior to analysis.

Researcher Positionally

In qualitative research, it is the researcher themselves that acts as a data collection instrument so it is feasible that a researcher’s beliefs, culture, or background could influence the research (Bourke, 2014). It is therefore appropriate to consider my own positionality in relation to this research.

From a young age, I have enjoyed taking ownership of my learning. One of my enduring memories of primary school involves a project all about Australia. I had a connection to Australia, a distant relative who often sent postcards and trinkets. This connection led to a huge interest in Australia, its geography, its wildlife and everything about it. It was probably my first experience of IBL.

I have been involved in IBL for a number of years in terms of professional development and as part of my own teaching. Keen to explore IBL further as a topic, my dual role of researcher and teacher of the participants, meant that while I may have some expertise to share with them and help guide them through an inquiry process, I also had to be alert to the risk of influencing their engagement, participation or viewpoints.

Ethical Issues

The ethical considerations of this research prioritise the avoidance of “causing harm to individuals, breaching confidentiality, using information improperly and introducing bias” (Kumar, 2005, p.211). The use of qualitative research requires a level of direct communication with individuals, so potential sensitive or personal information could be revealed. As researcher, there are certain ethical guidelines and standards which I am responsible for, which are outlined below.

Consent.

In dealing with participants who were children, informed signed consent was obtained upfront from both parents and the children, with full disclosure of the nature and purpose of the study as a whole. Participants and parents were informed of their right to privacy, and the steps that were taken to ensure this. Participants were informed of their right to withdraw at any stage. The final submitted dissertation would not include any personal data regarding individuals or institutions. The children showed a good grasp of these assurances and seemed eager and content that their input would be valued whether their engagement and responses were positive or negative during the course of the research.

Anonymity.

The Data Protection Act (1998) stipulates the requirements of the researcher with regards the collection, storage and dissemination of data. In complying with this, no names

of participants were used in this research, and all information collected was stored securely on a password protected computer. Hard copies of children's work were stored in a locked drawer and the use of online tools such as Flipgrid and Book Creator were password protected. The NVivo program containing project data was only accessible on a password protected computer.

Ethical approval was received from Marino Institute of Education Ethical Research Committee, based on information provided regarding proposed methodologies and participants, and in line with the above considerations.

Risks to Participants.

Risk to participants around data were minimised through the measures outlined above. Participants were informed that data collected would be used for this research only, would always be anonymous and would be stored in a secure way. Interview participants and their parents were reminded that participation was voluntary and that they could withdraw from the study at any time. Additional consideration was given when video interviews were chosen as a research instrument, with up to date American Psychological Association (APA) guidelines followed for the use of online video tools such as Zoom and Microsoft Teams (Deangelis, 2012; Greenbaum, 2020).

Limitations of this Study

Potential for bias.

This is a qualitative study where the aim was to measure the experiences and opinions of fourth-class students in one school, in one geographical area. It is clear that data collected will reflect the experiences of these particular students. However, with the aim of the study to see if engaging in outdoor IBL is valuable and engaging for participants, this study could be transferable and be of interest to all primary schools.

My role as teacher and researcher exposes the potential for researcher bias. As the participants were aware that this study was part of my own research, I wanted to ensure they were not influenced to behave in a way that they wouldn't have if they were not aware of this being part of the research. Coupled with my personal experience and interest in the subject area, considered deliberation and reflection of my role throughout the research was maintained and during outdoor inquiry lessons the procedures of a typical school outing were followed with the participants.

Covid-19 pandemic.

All schools in Ireland were shut from the 12th March 2020 due to the worldwide outbreak of the Covid-19 pandemic. This meant that part of the research had to be adapted to accommodate this. The participants at this stage had already planned their inquiries collaboratively but had to complete them independently. This may have hindered students who were planning to continue working collaboratively but at the same time may have facilitated students who prefer independent inquiry.

In place of continued observation and facilitation of the inquiry, during the school closures I instead issued guidance to parents and children to help them complete their inquiries. Whilst some stimulating and engaging inquiries occurred during this stage, observing IBL in real time at this stage was not possible.

Geography and size.

The school is located on the edge of a town with lots of amenities within walking distance. For an accurate representation of whether engaging in IBL in a school's local area is valuable, more overarching research of schools from around the country would need to be

done. This would include schools in urban and rural environments, schools which are DEIS⁴ as well as non-DEIS schools and schools of different sizes. This study is a small qualitative study, aiming to give a flavour for the merit of outdoor IBL. It is envisaged that the findings of this study may lead to further research involving Irish primary schools more extensively.

A case-study approach.

Whilst a case-study approach was deemed the best fit for this particular research, it is important to acknowledge its possible limitations. A case-study is just that: one small, particular study during a particular period in time. It can generate large amounts of data, which can lead to difficulties in allowing enough time for adequate analysis of this data.

A case-study can be prone to issues around reliability and validity (Ebneyamini & Moghadam, 2018). It can also be difficult to generalise the results of a single case-study in order to apply over a larger population (Crowe *et al*, 2011).

Conclusion

In this chapter I began by restating the research questions central to this research. I then gave a brief overview of the background to the study including the setting and the chosen population sample. The philosophical foundations underpinning the research were outlined, the chosen methodology explained, and data generation and analysis were discussed. Ethical considerations and validity and reliability of the research were explored, including an examination of any limitations of this research. The next chapter will explore the results of the study.

DEIS - Delivering Equality of Opportunity in Schools, is a national program to support disadvantaged students.

Chapter 4: Findings and Analysis

Introduction

This chapter analyses the data generated using the observation and focus group instruments as described in Chapter 3. Each section addresses at least part of one of the research questions and this is indicated at the outset of each section.

The aim of this chapter is to present and analyse the findings of the research in order to answer the research questions, restated below:

- Can the outdoor environment of a school provide a good stimulus for Inquiry-Based Learning (IBL)?
- Does engaging in a cycle of IBL impact upon student learning and how?

In the previous chapter, the research methodology of this study was outlined. The qualitative approach chosen allowed me as researcher to gain an insight into children's experiences throughout the cycle of inquiry, based around a local reservoir and stream. The data generated was gathered using research instruments that allowed for participants to share personal opinions, and also allowed me as researcher to observe their actions and reactions first-hand, which would have been difficult to quantify with a statistical/ numerical approach.

In the following section, the findings are presented and analysed, firstly, in relation to whether the outdoor local environment is a good stimulus for outdoor inquiry and secondly in relation to how this particular cycle of inquiry impacted student learning.

Presentation of Findings

The school local outdoor environment as a stimulus for inquiry.

In this section, evidence from the study will be presented and examined in order to ascertain if the school's local environment was a good stimulus for IBL. In the Literature Review chapter, I refer to Barrable & Alexios' interpretation of the theory of Affordance.

They describe affordance as “the properties of a place, which in relation to the child's abilities can enhance learning potential” (Barrable & Alexios, 2019, p.45). This section will explore Affordance in terms of what the local outdoor environment offered to stimulate or enhance the outdoor inquiry of the young participants of this particular study.

I also highlighted the importance drawn by several researchers of the significance of personal connections by learners at the initial stages of an inquiry (Short 2009, 2017; Stripling, 2003; Murdoch, 2015; Justice *et al*, 2002).

The suitability of the school’s local environment for stimulating IBL amongst young learners will depend on the different affordances of the area and the children’s connections to them. Below I will outline the different affordances which were presented at the initial stages of this inquiry, and the children’s connections which were evident. The data to be interpreted in this section were generated on the day, recorded in a research journal and afterwards, through focus group interviews.

Children’s connections to local history.

Upon arrival at the initial site visit, the angling lake and former reservoir, the children were told by Pierce⁵, one of the anglers, about a famous former inhabitant, a famous athlete, who grew up on the grounds of the reservoir. His father was the gatekeeper and many of the children seemed curious about his life and how people lived back then. *Fig.8* demonstrated to me that the children were engaged by Pierce’s stories as they moved closer to hear them.

⁵ All names used throughout this research are pseudonyms, except the researcher’s name.



Figure 8 - Participants listen attentively to Pierce, March 10th, 2020.

The transcript below reveals that the children were naturally curious as they discussed the living conditions and daily life of the athlete's family in their small home in the late 1800s.

Brian:

In the house, there would be probably two—there would probably be a bed for the mum and dad and there'd be like two bunk beds.

Anabelle:

Two bunkbeds stacked on top of each other.

Interviewer:

Do you think they had bunk beds?

Colin:

No, not even...

Brian:

Not as advanced as now, but they did have bunkbeds.

Colin:

I'd say just a bed, and four people slept in the exact same bed and then some people just slept on the ground with blankets.

Interviewer:

I'd be interested to find this out.

Brian:

I know they made wooden bunkbeds and then they would've slept on it and then the rest maybe...

Colin:

So where would they get the bunkbeds from?

Anabelle:

Maybe they would take turns on who got to sleep on like plank of wood or something.

Brian:

No, they just need wood, they farm the wood.

Colin:

They wouldn't be allowed. Oh wait, they would because their dad is the gatekeeper.

(Focus Group 1, lines 329-357)

The children were connecting their own knowledge of living situations: bunkbeds are a good solution to a shortage of space and so perhaps the young athlete's family used bunkbeds. The discussion continued around practical aspects of living in a small house, from toilet facilities to the possibility that the young athlete began practising his skills just "burn time" (Focus Group 1, line 298). Colin connected the athlete's probable childhood experiences to his understanding of his own mother's childhood.

Interviewer:

Do you think he would have spent a lot of time indoors?

Anabelle & Colin:

No

Interviewer:

He would have been outdoors a lot?

Colin:

Like my mum says, when she was younger, she said you only go in to eat and then you go straight back out again.

(Focus Group 1, lines 299-307)

The above data suggests that children's curiosity was stimulated by the local history of their area and, in particular, the human stories which accompany it. This one piece of local history stimulated engaging dialogue amongst the students and suggests that a school's local area can stimulate IBL in history.

Children's connections to environmental awareness.

The green initiatives at the reservoir captured the interest of a number of the children, including: areas of growth purposely left untouched to encourage wildlife, solar lighting in the angling club's cabin, natural methods to protect the lake from invasive species and the use of a solar pump to re-oxygenate the lake (*Fig. 9*).



Figure 9- The children learn about the solar pump. March 10th, 2020.

The solar pump and environmentally friendly initiatives at the reservoir piqued Mary's interest and later prompted her to focus her own inquiry on surveying the pollution and litter in her local stream and then doing a clean-up of what she found.

Mary

Yeah, they had this solar pump, which, rather than getting—they got electricity from the sun to help give oxygen to the water to help spray it up into the air, rather than wasting electricity on it. Um, and they were very conscious of like we need this tree to help this insect, and they want the insects to fish, but even still, it's very good.

(Focus Group 2, lines 92-97)

My interpretation of the above data is that the local area presented a number of opportunities where children were engaged by the range of man-made initiatives to help with conservation and protection of the local environment. In this case, the connections to environmental awareness stimulated a unit of inquiry for Mary.

Children's connections to living creatures.

At the reservoir, the anglers had left four buckets with samples of different water insects they had taken from different areas of the lake. Many children were surprised by the range of creatures and were particularly interested in observing them in the water. Timothy had a particular connection, as he was already keenly interested in insects and shared this connection with his peers (*Fig. 10*).



Figure 10 - Participants are curious about the water insects. March 10th, 2020.

The children discussed the range of creatures which might live near the reservoir. They used their prior knowledge and worked collaboratively to figure out possibilities.

Anabelle:

What's that thing that has a burrow. No, it's not a burrow.

Brian:

A rabbit?

Anabelle:

No, it's not a rabbit [laughter]. No, it has, like a—well a wall.

Colin:

Beavers, they make dams.

Anabelle:

Dams, yeah.

Colin:

Beavers, yeah.

Interviewer:

So, you said that we don't have beavers in Ireland.

Colin.

They're supposed to be bringing them back.

(Focus Group 1, Lines 544 – 559)

This data illustrates to me that the children were stimulated by the affordance in the local environment, in terms of the range of creatures. Several children went on to focus their unit of inquiry on the living creatures that live in or along the stream.

Children's connections to plants, trees and vegetation.

The reservoir and stream were a rich source of vegetation and plant life. Some children made connections between the plants that they encountered and their previous knowledge or experience. As well as what was growing naturally, specific trees had been planted to attract fruit flies. This sparked a discussion between Kevin and Michael who had a prior interest in insects and wondered why some insects preferred certain trees:

Kevin:

Maybe they can taste the fruit.

Michael

They have antennae. They probably taste through them.

(Researcher Journal, 10th March 2020)

Barry was drawn to the range of plants and trees planted to attract certain insects. I noted the following on our return from the reservoir: "Barry inquisitive today, big interest in fruit trees and why they attract flies. Also, reeds and invasive weeds! Topic for him to choose?" (Researcher Journal, 10th March 2020).

Anabelle often collected mushrooms and on the walk around the reservoir she noticed a red fungus. She took photos of it so she could later try to figure out what it was (*Fig. 11*).



Figure 11 - Anabelle was curious about a red fungus. March 10th, 2020.

The data in this section, presented in the form of children's interview responses, researcher observations and a photograph taken by one young learner, suggest to me that the local area's natural environment, the variety of trees, plants and other vegetation, stimulated high levels of interest amongst learners and provided an excellent starting point for several of the children's IBL.

Further connections.

There were many more examples of how this local setting provided rich opportunities that stimulated the children's interest and led to their engagement in a cycle of IBL.

Shaun's interest was drawn to the old structures and piping at the reservoir.

Shaun:

He said that there was a pipe over 200 years old there and it was still sort of working.
(Focus Group 2, lines 331-333)

Shaun:

He showed my group that there was this pipe that they had to dig up out of the ground cause it was broken and they had to replace it with a new one and it would have took them ages and ages to put it in.

(Focus Group 2, lines 360-363)

Further, Shaun's connection and curiosity in the old cranks and piping system, led to a number of the other students developing a curiosity (Fig. 12).



Figure 12 - Children curious about the old cranks and pipes. March 10th, 2020.

Anabelle showed a particular curiosity for where the water went after it flowed out of the reservoir. A large part of the stream flowed underground, and she hadn't been aware it passed under the main road near the school. She knew where the stream emerged closer to the sea and wondered if tracking it would be possible.

Anabelle:

We could track it as we walk. Say there's a sign, so we would do a map saying "school" and then whenever we seen a sign of where we are, we would write that down. Then, kind of like a map, if we turned somewhere, we would do like a little turn here, and then you would write what lane or road or something that is.

(Focus Group 1, lines 794 – 800)

The research question that has been addressed in this section asks if a school's local environment is a good stimulus for IBL. The findings presented suggest that in this study, the local environment was a rich source for potential areas of inquiry. The children were drawn to a range of interest areas. One unexpected, or perhaps overlooked affordance was the people of the local area. While the environment itself stimulated numerous areas of interest, the people, in this case the anglers at the reservoir, also provided opportunities that successfully ignited new interest areas for the participants.

The impact of outdoor IBL on student learning.

This section is concerned chiefly with the second research question, asking does engaging in outdoor IBL impact young learners and how.

Several authors, as referenced in the review of the literature, drew a link between an IBL approach and learners who were more engaged and motivated (Short, 2009; 2017; Murdoch, 2015), developed deeper, more meaningful connections (Dana, Thomas & Boynton, 2011; Scott & Friesen, 2013; Short, 2009; 2017) and were happier about their learning experience (Chiarotto, 2011; Pike, 2015). In order to explore this link between IBL and its effect on student learning in this study, I have organised the findings under the headings Motivation, Engagement and Learner Disposition. This is to reflect on and analyse the ways in which student learning may be impacted by IBL, as supported by the literature.

Motivation.

One of the perceived benefits of IBL, highlighted in Chapter 2, is that learners are drawn in by natural curiosity and connections to their own knowledge base and life experience. Chiarotto (2011) explains that students are more engaged when involved in outdoor IBL lessons: "Students engage deeply with the content because it interests them, not because they are expected to learn it" (p.9). In this study, following an IBL approach allowed

participants to be active agents in their learning and to make choices about the course of their inquiry.

After observing the eco-friendly management of the reservoir, Mary was motivated to find out about litter and pollution in her local stream:

Mary

I was going to do litter survey on our river and then clear up all the litter. All the litter that I can't—I might have to get my brother or my dad to help me because some of it's pretty big.

(Flipgrid Video, March 22nd, 2020)

Mary continued with her cycle of inquiry, to see if more wildlife would come to the river once it had been cleaned up and was monitoring the bird calls that she could hear at certain parts of the river. It was clear that Mary was motivated and taking control of the direction of her learning which the IBL approach allowed.

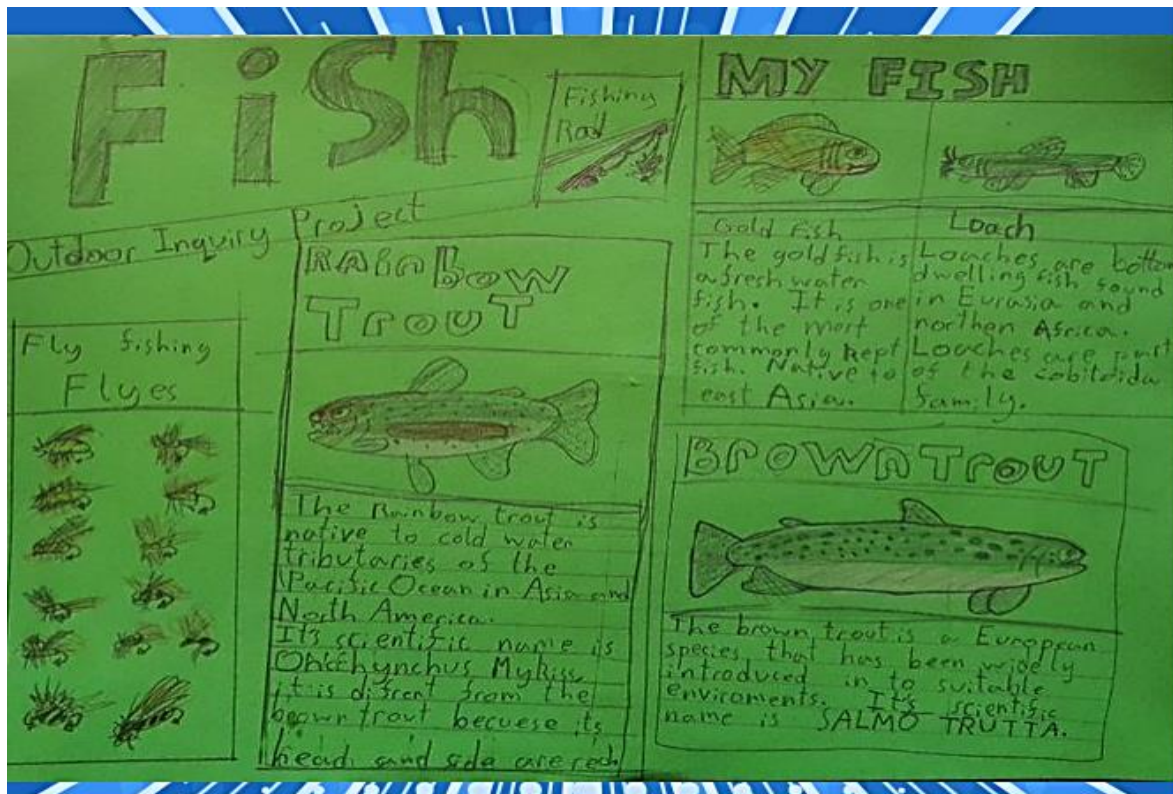
Rhys showed great interest in the range of creatures at the reservoir and took particular interest in the molluscs he discovered when looking for frogspawn.

Rhys loves frogspawn and looking for tadpoles, and we looked in every rockpool there was in the place and there happened to have no frogspawn, or no tadpoles. So, it was interesting. But then we discovered all these on the rocks, and they were everywhere then and I told him the story, like I just said, my grandmother told me. And it sparked an interest I suppose that was how it started, didn't it? Because it was really by accident, but then I guess that's the joy of like curiosity and then you know, you're out for a walk and then you discover things, you know?

(Telephone Interview Three – 3rd April – Rhys & Annie, lines 179 – 186)

Rhys had high levels of motivation to complete this project: his mother explained that he had spent hours each evening completing his project using the Book Creator App.

Peter's initial attention was also drawn to the range of aquatic life at the reservoir. He decided to focus his investigation into the types of fish found in the reservoir (*Fig. 15*).



Audio Transcript:

You will see my fish, a Goldfish and a Loach. There's one thing about Brown Trout, another thing about Rainbow Trout and then there's one in the bottom left corner with some flies that they use for fly fishing and then I just have some facts on some stuff.

Figure 13 - Peter was motivated by aquatic life.

The data presented in the examples above suggests that one way in which IBL impacted learning was through increased levels of motivation. Although all of the participants' initial involvement in the inquiry stemmed from the same outdoor trip, it was the agency they were given to follow their own lines of inquiry, in areas that interested them, which led to high levels of motivation.

Engagement.

A perceived benefit from the review of the literature, of an inquiry-based approach is that learners become more engaged in their learning. (Wolk, 2013, Short, 2017).

To be able to measure the children's engagement in this study, it was valuable to be in the dichotomous position of class teacher and researcher. Some students stood out from the

beginning for particularly high levels of engagement during this type of learning. Tiernan, on the first day at the reservoir, began with lots of questions and continued to make observations and ask questions throughout the visit. He then completed a recap sheet about the visit to the reservoir and areas he was curious about. In class, Tiernan usually requires regular movement breaks and often completes written tasks quite hastily. I noted that on this task Tiernan spent 25 minutes ensuring his drawing was accurate and asked for help to correct some of his spellings (*Fig. 16*)

Field trip Report

Where
Draw a picture of the reservoir - include labels



What
What are you curious about learning? (Write or Draw)

The solar pumps The bees 	I wode like to learn about solar power.
--	--

Figure 14 - Tiernan's review worksheet showed high individual effort.

Similarly, Michael seemed to engage more deeply with an IBL approach, than the more formal setting of the classroom. (Fig. 17).

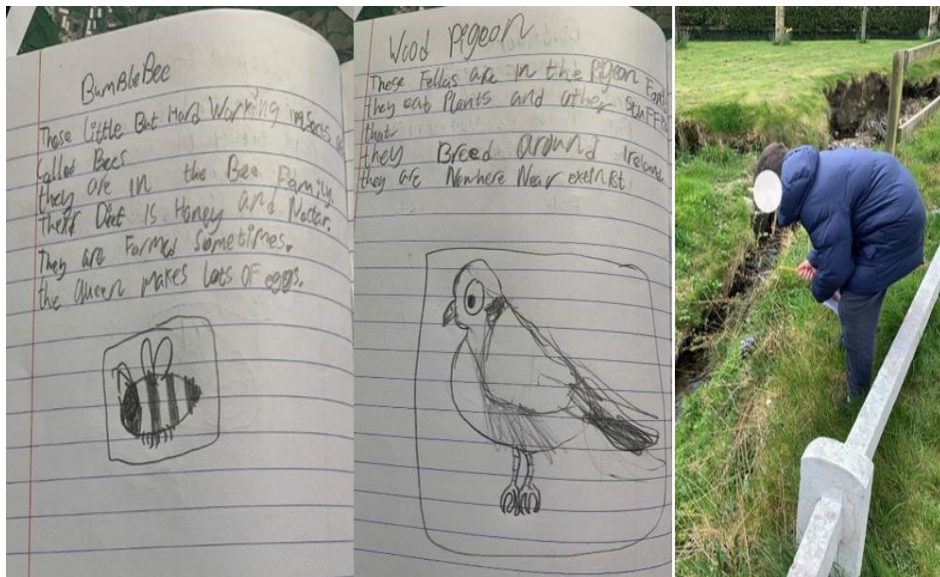


Figure 15 - Michael was engaged in outdoor investigation.

Michael appeared to be more interested and involved during the outdoor, investigative phase of his inquiry, which he reflected upon afterwards.

Michael:

Yeah, it was interesting, because it was more fun than like just walking by a stream. We *actually* got to work there, which made it more fun.

(Telephone Interview Four – 4th April – Michael and Paul, lines 513 – 515).

Another learner who seemed to have high levels of engagement during the cycle of inquiry was Colin. Colin completed a detailed inquiry around his own local stream covering multiple themes: litter, water quality, insects and plants and wildflowers (Fig. 16).

Colin expressed that, as well as being engaged in this type of learning, he also really enjoyed it.

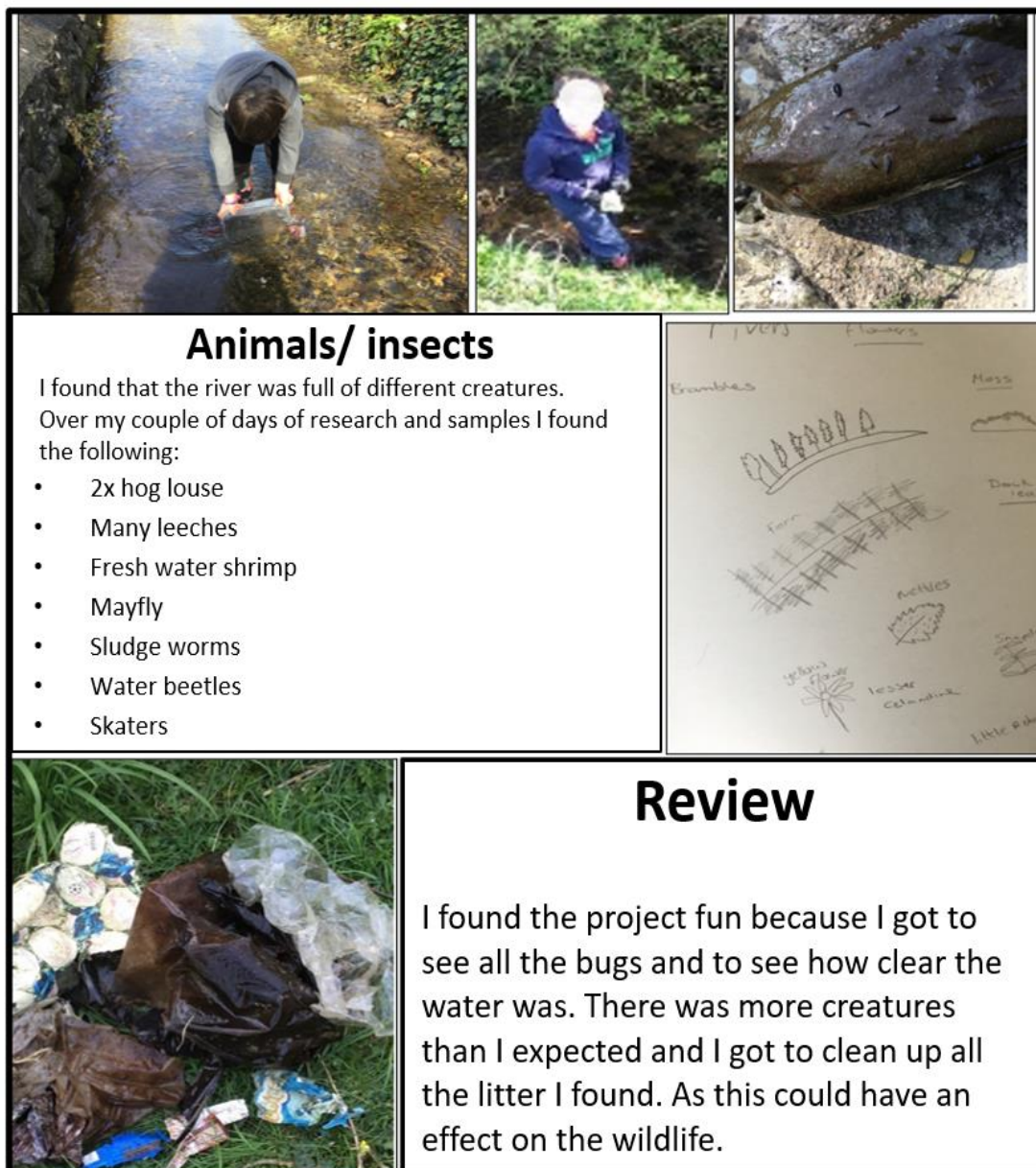


Figure 16 - Colin was deeply engaged in his stream inquiry.

Colin:

I think you can learn more, because if you're in class you're just seeing photos of other people seeing it.

Interviewer:

Yes.

Colin:

If you're outside you can see it for yourself.

Interviewer:

You see for yourself. And does that make a difference to you?

Colin:

Yeah. For me it does anyway.

(Telephone Interview Two – 3rd April – Colin & Audrey, lines 269 – 279)

The evidence presented above, with the examples of Tiernan, Michael and Colin showed to me that the IBL approach significantly impacted student engagement. My dual role as class teacher and researcher allowed me to clearly see that these students were considerably more engaged when participating in outdoor inquiry compared with learning about their environment from within the classroom.

Learner disposition

In this section, the impact of outdoor IBL on learners continues, with a focus on how it can affect learner disposition. In Chapter two, one of the perceived benefits of learners partaking in inquiry-based studies is a more positive interpretation of their learning experience (Chiarotto, 2011; Pike, 2015). There was multiple evidence during the course of this study of highly positive disposition amongst learners. This presented in my own observations, interviews with participants and also with some parental feedback during the telephone interviews.

Measuring learner experience of IBL is not straightforward (Frezell, 2018). Happiness is a notoriously difficult concept to measure. In preparation for interviews with participants, I was conscious of the need to keep questions neutral, that is, to ensure that I didn't lead the participants to particular answers. It was important to give the learners time to discuss and reflect fully on their experience. Using a variety of instruments, including observations, interviews and work samples, I triangulated the results to get a good sense of the attitude and disposition of learners throughout the cycle of inquiry. Often, spontaneous moments captured feelings better than a detailed interview could have. One example was Matthew.

Matthew, in the picture in *Fig. 12*, upon completing the circuit of the reservoir unexpectedly smiled and said, "I just really like this, it's really cool". As his teacher, Matthew's cheerful nature was particularly pleasing, as he had sometimes found it difficult to motivate himself and would often criticise his own ability.

I noted in my reflective journal “Inquiry proving to be a great leveler” reflecting that, regardless of academic ability, the children all found something they were curious about, which led to high engagement in the process and created a very positive, industrious atmosphere.

Michael’s father, Paul, noticed an improvement in Michael’s attitude to learning when he had more control of his learning, during the outdoor part of the inquiry.

Paul:

I think Michael is much more engaged outside than when we sit here doing it. When we did the so-called research part, when he researched about animals and so on, he wasn't as engaged than outside taking notes and looking at the stream itself, and when we talked about the pollution and looked at how much rubbish is there. He was obviously much more interested outside.

(Telephone Interview Four – 4th April – Michael and Paul, lines 423 - 429)

It can be inferred from the above examples of Matthew and Michael that outdoor IBL can significantly impact the attitude and disposition of some learners. This finding is reinforced by data presented in a number of statements, that were evident in more than one student’s comments, as the examples below illustrate.

Brian

There were three groups of 16 people, just getting to walk the reservoir and getting to learn about, 20 new things that they didn’t know about, which I found really, really cool.

(Focus Group 1, lines 22 – 25)

Kevin

I found it really nice because it's just, I like nature and I like learning about the reservoir and just...all of that.

(Focus Group 2, lines 17 – 19)

Anna:

I found it exciting and nice to learn all about (Name of athlete) and like, the nature there.

(Focus Group 2, lines 7 – 9)

Marcus:

Inside you’re sitting down all day, so when you are outside, you don’t just sit down. It's like a massive break, but you're still learning in your break.

(Focus Group 3, lines 157 – 160)

Colin:

It was one of my favourite days this year, easily. I liked knowing the trees that they planted there to bring in all the flies so the fish could eat their babies and larva. I liked the way he explained how the forest was untouched for 30 years and how the dam worked.

(Focus Group 1, lines 28 – 32)

Shaun

It was fun, I really liked the nature walk as well around the whole thing and it was really exciting.

(Focus Group 2, lines 32 – 34)

Mary:

It's nice to get out of the classroom, not necessarily having to go somewhere, well, that you'd call far away.

(Focus Group 2, lines 385 – 387)

The data in this section, shows a consensus amongst the participants who associated their experience of outdoor inquiry with positive sentiments. The findings in this section reflect the findings from the literature, that learners involved in IBL are more positive about their learning experience (Chiarotto, 2011; Pike, 2015).

Conclusion

In this section, I have presented the findings and analysis of the study, with a view to answering the research questions. Firstly, if the local outdoor environment provides a good stimulus for IBL for young learners and secondly, does engaging in outdoor IBL lessons impact young learners and how.

When interrogating the data from this study it is evident that the school's outdoor environment provided a rich source of stimuli for IBL, with children drawing connections to the history, environmental issues, flora and fauna, mechanical structures and geographical location of the area.

Findings show that engaging in outdoor IBL had a noticeable impact on the participants of the study. My dual role of teacher and researcher gave me an extra insight

when interpreting the data, which showed, both in the field and during interviews, that learners were highly motivated, deeply engaged and had positive disposition toward learning when involved in outdoor inquiry.

While this study generated rich qualitative data, there are difficulties with attempting to extrapolate findings of a small-scale study like this one across a wider population. The limitations of the study and potential for further research will be presented in the next chapter.

Chapter 5: Conclusion

Introduction

The aim of this research was to investigate if outdoor Inquiry-Based Learning (IBL) can impact the educational experience of young learners. The research followed a case-study approach, following the experience of 4th Class students engaged in IBL over a period of four weeks. Data was collected through qualitative methods, including focus group interviews, video interviews, photographs, researcher observations and work samples.

The research explored the opportunities, or affordances, that the local area of a school can provide for learning through inquiry. The impact of learning through IBL in the outdoor environment on the learning experience of participants were then analysed.

This chapter presents the conclusions drawn from this research. The conclusions have been made through careful interpretation of the findings, with consideration given to research limitations. Recommendations pertaining to how this outdoor IBL research may be useful to stakeholders in primary education are provided, as well as potential areas for further research in this area.

Conclusions

It was evident from the findings that the local outdoor environment of this school had ample affordances, in educational terms, and provided stimuli which helped to engage the participants in learning. Conclusions about the affordances presented by the local outdoor environment and impact of outdoor IBL on the participants are presented below.

The local outdoor environment provides abundant affordances for IBL.

The local outdoor environment presents unique opportunities that help to stimulate young learners' curiosity at the start of a cycle of IBL. In this particular research, the children's curiosity was stimulated by a variety of areas of interest, from old piping and

mechanical structures, to aquatic life, flora and fauna, local history and environmental awareness and care. While the data presented in this study relating to children's initial interests is quite specific, all schools have their own unique local environments and potential areas of interest which could be explored. As Zenobia Barlow in an interview with Jensen (2002) succinctly put it "You don't need to be in the wild to use the environment for learning. Life is erupting everywhere".

Engaging in outdoor IBL can have a profound impact on learners.

The data from this study showed that engaging in a unit of outdoor inquiry had an impact on participants, particularly in terms of their motivation, engagement and overall disposition toward learning. These are presented separately below:

Learner motivation.

The initial curiosity in an inquiry, supported by learner connections, is a key part of the cycle of inquiry (Short, 2009; Murdoch, 2015; Stripling 2003). The findings of this research provided rich data on the impact of outdoor inquiry on student learning. Participants were motivated by the open-ended nature of the initial site visit, the agency they had in their own learning and by being able to focus their inquiry on a something they felt compelled to investigate and "not because they are expected to learn it" (Chiarotto, 2011, p.9).

Learner engagement.

Children's previous knowledge and connections were a strong driving force for their motivation in their inquiries as evidenced in Chapter 4 by the examples of Mary, motivated by environmental awareness, Peter's interest in water organisms and water quality, and Michael's purposeful investigation of the wildlife along his local stream.

This study had a strong focus on the local community, both as originally planned with the valued guidance of local anglers, and also an unplanned result of a 2km from home restriction on all participants during the initial Covid-19 related regulations. Participants

made strong connections to their local area, especially its history, wildlife and geography and this made learning more meaningful than textbooks could, tying in with the assertion by Barlow (2016) that children can better make sense of the wider world around them by first making connections at a local level.

Outdoor inquiry leads to positive learning experiences.

The participation of learners in this outdoor IBL strongly showed a positive disposition to learning. Pike (2015) and Chiarotto (2011) note more positive attitudes to overall learning experiences when an inquiry-based approach is followed. This principle is strongly reinforced in this research, illustrated clearly in Chapter 4, by the children's comments about their IBL experience and their feedback and discussion from the focus group interviews.

Inquiry is concept-based rather than content-based.

Linking back to the literature, inquiry is less about acquiring specific content or knowledge, but actually engaging in deeper questioning and investigation in order to make sense of the world around them in a more profound way (Murdoch, 2015; Wolk, 2008; Chiaratto, 2011). Data recorded, in the form of researcher observations and focus group interviews, showed that collaboration was important as children worked together to make sense of the information in their different areas of study. This unit of inquiry didn't begin with a list of what children must learn, and if it had, it might have stifled their creativity and curiosity. Instead, through IBL they could focus on making sense of their data and findings, answering their own questions and understanding new information in a more concrete and purposeful way.

Limitations of the Study

Size of the study.

As this was a Masters level study, there were certain time and word count parameters associated with this type of research, so careful consideration was needed for which data could be included in the research findings.

Although the data gathered in this research helped to give a rich insight into how outdoor IBL impacted participants' overall learning, this is representative of the views and experiences of small population sample in a particular place and time. The experiences reflected in this study might not be replicated in a similar study with different participants, time or location.

Case-study approach.

A case-study approach was useful for examining the empirically rich nature of this research, however there are certain limitations with this type of approach that should be considered. These include the absence of methodological procedures, the potential for researcher subjectivity or bias and difficulty with applying the results across larger populations (Willis, 2014).

Covid-19 Pandemic

A particular limitation of this study was that it took place in the midst of the outbreak of the Covid-19 global pandemic. This changed the course of the original planned inquiry, changing the collaborative nature of the second part of the inquiry cycle as the participants were limited to their home environments.

A central tenet of qualitative research is that the researcher is usually heavily immersed throughout the research. Because of school closure, this wasn't possible physically, but technology allowed it to continue remotely

Conversely, some potential opportunities for further research arose from the remote nature that the children's inquiry took, including parental involvement in IBL, using technology to facilitate IBL and using children's own local area to stimulate inquiry.

Recommendations

Having examined the literature on IBL, Outdoor Education and current commentary from an Irish curricular perspective, the following recommendations are offered:

- **A large-scale study of using IBL in schools' local areas should be conducted.**

This research supports the contention of many researchers that IBL is a valuable learning philosophy (Short, 2017; Murdoch, 2015; Wolk, 2008; Stripling, 2003; Erickson & Lanning, 2014) and that a school's local area can provide many stimuli for new IBL. To gain a more rounded insight into whether outdoor-based inquiry would be a good fit in a new Irish curriculum, policy-makers and government bodies should consider larger scale research, incorporating many different types of school settings and with children of various ages.

- **A more integrated curriculum incorporating outdoor IBL.**

This study created a small window into how children learn, and it was evident, when following an IBL approach, that their natural curiosity of the world around them led to deeper engagement and rich learning. A more integrated primary curriculum focusing on an IBL approach would help to limit curricular overload and lead to increased motivation, engagement, a deeper level of understanding and overall satisfaction amongst primary school students. It would also reduce pressures currently acknowledged on teachers attempting to teach a fragmented, subject-driven curriculum. Government bodies and stakeholders should consider further research into outdoor inquiry to help design a new, integrated curriculum, not just in the early years of primary school but for all age levels.

- **A focus on the local community.**

In order to increase young learners' motivation, engagement and to develop a deeper level of inquisitiveness and understanding, training for educators in how to use a school's community for outdoor IBL should be provided. Specific continuous professional development courses, focusing on IBL methods and developing guidelines and resources should be developed and rolled out by local education centres.

The Potential for Future Research

This research offered a valuable insight into how young people learn in a deep and meaningful way. While this research had a defined area of interest, a number of potential areas for future research arose.

- As suggested in the Recommendations section, a larger scale study exploring outdoor IBL in a wide variety of schools, encompassing different geographic areas, different sized schools and various class levels is proposed. This would help to give a more widespread impression of the impact of outdoor IBL on primary school children and whether it would be a good curricular fit
- The Covid-19 pandemic unfortunately led to school closures in Ireland at the mid-stage of this research. A silver lining was that this also introduced some noteworthy new themes which could be of interest to IBL practitioners:
 - Important parental insights into how their children learn were unearthed during this research. Further research to include the insight of parents in the home-based learning and in IBL could add an additional, valued perspective to this research (See Appendix 2).
 - At the time of writing, no decision had been made on how or when schools could fully re-open. Further research on remote IBL lessons, facilitated between school and home and incorporating technology such as Flipgrid,

BookCreator, SeeSaw and Google Classroom, could help provide a new balance, especially in a scenario where children have to split their time between school and home.

- For the purpose of this research, the Framework for Outdoor Inquiry (*Fig. 7*) was developed. Whilst a comparison between different models of inquiry helped to truly lay out the path of a cycle of inquiry for this research, it could be of interest to explore if a framework for inquiry proves to be a useful guide for learners and educators during an inquiry cycle.

You don't need to be in the wild to use the environment for learning. Life is erupting everywhere. Weeds grow out of cracks in cement...Many urban campuses are covered with asphalt, but even there, one can still find a special place. Children have this tremendous ability to focus on minute things. If you're small yourself, you're more likely to see all these other tiny life forms – ants and such – that the rest of us pass by"

Zenobia Barlow, 2002

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Appendices

Appendix A – Parental Consent Form.

10th February 2020

Dear Parents and Guardians,

I am currently completing Year 2 of a Masters in Education Studies in Inquiry Based Learning at the Marino Institute of Education [MIE]. As part of my research, I am looking at the area of Inquiry-Based Learning and Outdoor Education, with a particular focus on SESE (History/ Geography and Science). The research aims to find out if engaging in learning through outdoor inquiry impacts student learning and will involve a number of outdoor lessons over between the 2nd March and the 3rd April.

The title of the research as it currently stands is:

What can be learned from a local stream? Using a school's outdoor environment as the stimulus for inquiry-based learning with fourth class students.

To analyse the children's learning which takes place during these sessions, it will be necessary to record our work. This will be in the form of audio recordings, my own written observations and children's work samples. I will hold short focus group interviews with the children after the outdoor inquiry lessons in order to gauge their own experience of this type of learning. Data gathered will be used for examination purposes only and will not name any individuals or institutions. Data will be securely stored for 13 months after the research has been graded. After this time, in line with best practise, all recordings and samples will be destroyed.

Ticking the consent form below will allow data and results from our inquiry to be shared with the college (MIE). In line with best practice I will also be seeking the children's consent to take part in this research. You may remove your child from the process at any time and the children also have the right to opt out of the research at any time.

If you have any questions or would like to seek clarification on any part of the research, please do not hesitate to contact me by e-mail: <e-mail>. I would greatly appreciate if all forms could be returned to me before this Friday, 28th February 2020.

Le meas,

Alan Bedford <e-mail>

For further details see:

https://www.mie.ie/en/Study_with_Us/Postgraduate_Programmes/Master_in_Education_Studies_Inquiry-Based_Learning/

Child's name: _____

Please tick all that apply:

- ☐ I consent to my child partaking in the above research
- ☐ I consent to audio recordings of my child being taken.
- ☐ I consent my child's work samples being used as part of the research .

Parent/ Guardian Signature: _____

Appendix B – Children’s Consent Form.

FAO: <NAME>,

Re: Inquiry Project!

24th February 2020

Dear <NAME>,

As you know, as well as being your teacher this year, I have also been working as a student with Marino Institute of Education. This has been hard work, but also great fun! I have been learning a lot about a type of learning called “Inquiry Based Learning” (IBL) and I am really interested to see how we can learn in our outdoor environment. As part of my studies, I want to see how you and the class feel about this style of learning (IBL) and learning in the outdoors in our community. I have arranged for our SESE (History, Geography and Science) lessons to take place in the outdoors over four weeks, beginning next Monday the 9th of March.

To see how you feel about this type of learning I will need to gather some data while we are working in the outdoors. Your name, school or location will never be mentioned so all data will be anonymous (top secret!). This will include: my own notes about what I see as teacher; copies of written work or pictures; and short interviews with some children in small groups.

If you are happy for me to share copies of your work as mentioned above, please tick the consent form below. I look forward to our learning adventure!

☒ YES
☐ NO



Please tick if you are happy to share the following (anonymous) data with my college

- ☐ My own notes about what I see as teacher during our lessons
- ☐ Photocopies of your written work or pictures (without your name)
- ☐ Audio recordings of short group interviews about our lessons

If you have any questions about this form or my research, please write them on the back of this sheet.

Appendix C - E-mail and Attachment sent to Parents to Guide Remote Inquiry.

Sent 22/03/2020

Dear <Parent's Names>,

I just want to first say **I hope you are all keeping safe and have managed to settle into a home routine.**

I am writing to you in my role of researcher with Marino Institute of Education. You may remember in February I asked for consent for <Child's Name> to take part in an Outdoor research project as part of our SESE studies. The title of the research is: *“What can be learned from a local stream? Using a school's outdoor environment as the stimulus for Inquiry-Based Learning with fourth class students – an analysis of student learning and the merit of using a framework to guide an Inquiry-Based Learning project.”*

The class had recently begun the outdoor inquiry and seemed to really enjoy it so far from the feedback I've received. Having had contact from my college, we are proceeding with our research where possible. This is where I will be hoping you can help out.

Over the next two weeks the children would have continued to be involved in outdoor lessons with me and would have worked collaboratively in groups to tie their findings together, using a Framework I designed to help them plan their work. As this is no longer possible in the way originally planned, I am hoping the children may be able to do some work as part of their home-school work. I have attached some documents with ideas of how they might complete this research. I understand this will not be possible for everyone, but if I had work submitted for 5-10 students that would give me enough data to continue with the research. In the attached pack I have given suggestions for how the work might proceed either through (safe, social distancing) outdoor walks or through using websites indoors.

The idea is that the children treat this part of the research like a Taitneamh project, using their own interests as the stimulus. Most of the children had already outlined to me an area they were curious about after their initial site visits. I would be really grateful if they could work on this each afternoon this week as part of their schoolwork. I will have it as the last subject area for them to work on each day. The children seemed really motivated before our term was unfortunately cut short, so I am hoping it will be something they will be eager to continue.

I would ask that the children use one of the attached **frameworks** to help guide their project as it will help me with my research question. The framework was originally developed to guide the children through a process of inquiry and to see if it's useful. Due to the new remote learning that we have had to endure, I would be even more interested to see whether or not the framework is a useful guide.

Finally, I have set up some online tools which would help "Child" to share their work with me and the class as they complete it. They can pick whichever one works for them, otherwise it may be easier to e-mail on any completed work to the e-mail address mentioned below.

Flipgrid allows to children to share short videos with the class, I have set up one specifically for this inquiry: <https://flipgrid.com/xxxxx>

I have set up a **Google Classroom**, which I am fairly new to, but it will allow the children to upload any documents to do with their inquiry.

<https://classroom.google.com/> Class code is: **xxxxx**

"Child" may prefer to use **Book Creator**, a tool for making online e-books or projects. The invite code is **xxxxx** 4th Class Green) and the children will be able to create books in the library and read each other's books. <https://bookcreator.com/>

"Child" has suggested <area of interest> as an area of interest.

If you have any queries at all about this research and how you might help, please e-mail me directly to <Researcher e-mail address>

I am happy to arrange phone call if you would like to discuss this further.

Best wishes to all,

Alan

Appendix D - Parent Telephone Interview Consent Form

Research project title: What can be learned from a local stream?

Can using Inquiry Based Learning (IBL) in a school's local environment have an impact on student learning? An exploration using a framework for inquiry with young learners.

Research investigator: Alan Bedford

Research Participants name: _____

The interview will take no longer than 30 minutes.

We don't anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project.

Ethical procedures for academic research undertaken from EU institutions require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Please read the accompanying information sheet and then sign this form to certify that you approve the following:

- the interview will be recorded, and a transcript will be produced
- you will be sent the transcript and given the opportunity to correct any factual errors
- the transcript of the interview will be analysed by Alan Bedford as research investigator
- access to the interview transcript will be limited to Dr. Karin Bacon (Thesis Supervisor) and with academic colleagues and for marking purposes
- any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymised so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed
- the actual recording will be kept for marking purposes and destroyed after a period of 13 months.
- any variation of the conditions above will only occur with your further explicit approval

Quotation Agreement

I also understand that my words may be quoted directly. With regards to being quoted, please initial next to any of the statements that you agree with:

Initials	Statement
	I wish to review the notes, transcripts, or other data collected during the research pertaining to my participation.
	I agree to be quoted directly if my name is not published and a made-up name (pseudonym) is used.
	I agree that the researchers may publish documents that contain quotations by me. (under a pseudonym)

All or part of the content of your interview may be used:

- In academic papers, policy papers or news articles
- On our website and in other media that we may produce such as spoken presentations
- On other feedback events
- In an archive of the project as noted above

By signing this form, I agree that:

1. I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time.
2. The transcribed interview or extracts from it may be used as described above.
3. I have read the Information sheet.
4. I don't expect to receive any benefit or payment for my participation.
5. I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality.
6. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

Printed Name

Participant Signature

Date

Researcher Signature

Date

Contact Information

This research has been reviewed and approved by the Marino Institute of Education Ethics in Research Committee (MERC). If you have any further questions or concerns about this study, please contact:

Alan Bedford

E-mail: <Researcher e-mail>

You can also contact Dr. Karin Bacon, thesis supervisor:

E-mail: <Supervisor e-mail>

Appendix E – Updated Parental Consent Form

25th March 2020

Dear Parents and Guardians,

As you know from my previous correspondence, the nature of our outdoor inquiry has changed, effectively meaning the children are working independently. From a research perspective, this has added a new dimension to some of the ways I will receive data and make observations about the children's learning. As you will have seen, the children are using Flipgrid and Book Creator to document their learning while continuing with their inquiry.

If I do use any of the children's work, it will be in the following way:

Flipgrid recordings: I would take an audio recording and transcribe it. Only the audio recording and transcription would be used and both would be anonymous. Book Creator: audio recordings and transcriptions used in the same manner as with Flipgrid. Drawings or writing from the e-book creations would be printed.

As with the previous consent form you signed, with this new data generated online, no mention of name, school details or location would be used. Data will be filed securely for examination purposes and destroyed after a period of 13 months after my Thesis submission (June, 2020). Work samples may be published in my thesis and possible in research publications, but work samples will be anonymous. A copy of my thesis will be made available to you once it is finished.

I have updated the consent form below to reflect these new methods of gathering data. I have also included an updated consent form for children and would greatly appreciate if you could fill in your forms together and ensure the children understand their own forms.

If you have any questions or would like to seek clarification on any part of the research, please do not hesitate to contact either myself: or my thesis supervisor Dr. Karin Bacon: <e-mail addresses removed>

Le meas,

Alan Bedford

For further details see:

https://www.mie.ie/en/Study_with_Us/Postgraduate_Programmes/Master_in_Education_Studies_Inquiry-Based_Learning/



Child's name: <Name>

Please tick all that apply:

- ☐ **I consent** to audio recordings of children's group interviews being taken or ☐ **I do not** consent
- ☐ **I consent** to my child's work samples being used as part of the research or ☐ **I do not** consent
- ☐ **I consent** to Flipgrid* and Book Creator* being used as part of the research or ☐ **I do not** consent

Parent/ Guardian Signature: _____

Appendix F - Parent Feedback Letter

Received 22/ 03/ 2020

NOTE: All names are pseudonyms and place names have been removed.

Inquiry projects at home, March 2020

Sandra Chisholm, parent, suddenly teacher, to Peter and Paul.

Peter Chisholm, (Date of birth), (Age) years old, 4th class.

Day 1. I asked Peter about the reservoir visit, and he told me minimal information (he doesn't like to talk about school when at home, keeps the two worlds very separate). He decided to do his inquiry about fish. He went to his room to make the flipgrid video about the topic he chose. He didn't want others around watching him (2 younger noisy brothers, bossy mother asking questions, etc). I watched his video after he had uploaded it, and I thought it was funny and chatty, which is more like his school persona, and we don't see him behaving that way at home.

Day 2. We walked to the stream at the (Local Bar) and followed it to the (Church) grounds. Peter told me this is the (Name) river, and the same one that feeds the reservoir. He told me more information from the trip to the reservoir as we were walking. We went to the fishman to see if we could buy trout and cook it. The fishman said that they would be getting sea trout at 12 noon that day from (Name) farm, a fish farm in (Place). When we got home, we looked up (Name) farm to see how the fish farm worked. Peter did not want to ask any questions about fish.

Day 3. Peter drew a poster about fish. He looked up the information online and included it in the poster. I went back to the fishman to get trout, which was already cut into fillets. I also got one sea bream as it was whole, so Peter could gut it and learn about the anatomy (He has done this before). He cooked the fish with his dad that evening. He did not really like gutting it, and I don't blame him.

Day 4. Peter watched Alan's videos about the cycle of inquiry on Flipgrid with interest. We looked up anatomy of fish online and saw the names of the various parts. He still did not want to ask any questions about fish, but he was interested in looking up information.

Day 5. I asked him how he would like to present his project on fish. He said he already did the poster, so he was done. I pushed it a bit and got great resistance. So left it up to him to do anything else.

Day 6. He decided to show and explain his poster on flipgrid. Then after your email with the options on how to present his work, he decided to do an ebook.

Paul Chisholm, (Date of birth), (Age) 3rd class, ASD1, diagnosed in summer 2017.

Day 1. I showed him the cycle of inquiry and we talked about picking a topic to do a project. He walked around the house and garden and came up with sea snakes. We spent some time looking at each of the 3 steps in the cycle of inquiry. First, I asked him what he already knows about sea snakes, why he likes them, what experience he has with them, and what questions he has about them. He wrote up his findings and thoughts in his copy.

Day 2. As we couldn't really go out and do anything about sea snakes, he used google to look up more information about sea snakes to see if he could find an answer to his question. He wrote up his answers in his copy.

Day 3. We talked about how he could present his findings. I suggested powerpoint (he has used it once before) or making a poster. He preferred to type up the project in a word document and add a photo. He started typing it, but it was slow and frustrating. So, he read out his words from his copy, and I typed them in word. He also decided that he would like to learn how to type while we are home these weeks. He has been told that he can do his homework on a computer because he struggles with handwriting (fine motor skills), but we have only done this once. So, we typed it up and printed it. I included a photo of his copy to compare with the typed pages.

Day 4. He made a playdoh sea snake. See photo.

My thoughts on the cycle of inquiry.

The cycle that we used (Alan's one) has three steps. This was very useful for implementing the project. The boys could take one step at a time and think about what was involved in that step. The other cycles of inquiry that you sent to me are more detailed, with more steps or unclear steps, and would be much harder to implement. Having three discrete steps was a good way to break down their work and realise which stage of the cycle they were focussing on.

Peter – it was hard for me to see how the three steps of the cycle were working as he didn't really want me involved in it. He was keen to watch your explanation of the cycle of inquiry on flipgrid. Once he did his poster, he felt he was done. He did not want to include the gutting and cooking of fish in the end, or any information about (Name) Farm. Maybe because I got too involved in it, and it wasn't his; it became part of home world, rather than school world. Or maybe because the gutting experience was off-putting. When he read on your email the different options, then he was happy to go ahead with an ebook. I gave him some support with it, but the design and content choices were all his. I noticed he was keen to make it entertaining and did not include any info on buying and cooking the fish, or walking along the river.

Paul's project was not really an outside inquiry, but more like a general project on sea snakes. Paul made the decisions, chose the topic, wrote up his thoughts, but it felt quite directed by me, instead of unstructured and learner-centric, which I think was the point using these cycles. He is a very free style learner, and can spend hours mulling over a topic, usually while moving. And then comes up with great questions and conclusions on certain topics that he is very interested in. He does not take the next step to write anything down, if left to his own devices. Actually, I could see that he was thinking about sea snakes between our writing sessions as he was jumping on the trampoline, or generally running around, which is how he processes information. So, using the cycle of inquiry connected to his natural way of learning, but gave a bit of structure (3 steps) and pushed him to a final step of actually writing. Without the cycle structure he would not have considered presenting or communicating the ideas in his head, where he spends a lot of time. Normally he finds writing and schoolwork very boring, but he enjoyed writing about sea snakes. In fact, observing how much he needs to move in order to do schoolwork/ learning was amazing, and helps me understand why he struggles so much at school, where he has to stay still. I include a photo of his copy vs the typed work to show how much he is challenged by handwriting. He avoids it as much as he can, and seems to be getting worse with practice, not better.

The two boys, Peter and Paul, responded very differently to the project, and partly that is because they respond differently to me. Paul was cooperative and open to it, and it seemed like a fun project to him. He took it in his usual free style of moving, talking and going into his own world and imagination. Peter didn't want me to interfere, maybe because it was part of his class work, and I am not usually involved in that part of his life. Maybe there was a bit of tween rebellion involved. I

think he would have responded very differently to a teacher than to me. They also have different personalities which was reflected in how they responded. Paul is an open-book, Peter a closed-book at home. Peter relates well to his peers and has many friends; Paul struggles to communicate with peers and has 1-2 friends. But they are both self-directed learners. And they are at different ages and stages of life. When they are interested in a topic, they get quite obsessive about it and have amazing learning through that topic. If I try to push a topic on them, they have little interest. I guess this is an argument for the power of cycles of inquiry, which is self-directed. I think it could be a great home-schooling tool. Because it gives a bit of structure but remains learner centred.

My experience of this project, the learning involved was very relational. Our parent-child relationship was part of the project and shaped what happened, and what learning happened. I think the context and situation in which we are doing this project becomes an important theme. We are doing schoolwork at home with parents instead of teachers, in a weird situation, that is full of worry and stress, but also fun and free time at home. If this learning took place in school, the relational aspect would have involved peer-to-peer, and student-teacher, which are different dynamics. Flipgrid did provide some of that relational context, but online.

Reading Kathy Short's chapter are inquiry cycles a stance, or a method, or a project.... Because the context is new in so many ways (doing schoolwork at home during an unprecedented lockdown), it is hard to compare this experience of cycles of inquiry with anything else! It is more like exploring and experimenting with a new phenomenon, rather than trying something new in an existing context. I am not sure what 'stance' means, but I think it is something like 'perspective'. Short says "inquiry is a collaborative process of connecting to and reaching beyond current understandings to explore tensions significant to learners." The collaborative part is what I was referring to above, the relational aspect of the experience. In relationships or in collaboration the students learn about themselves in relation to others, and in how others respond to them. The collaboration has an outward focus of attention. So, my questioning Peter on his work, and his presenting on flipgrid are both outward facing. And his outward faces to these two audiences are different. The inward facing learning happened when they were thinking through their topics. Peter integrated new information about fish (trout, rivers, angling, fishing, fish farms, anatomy of fish) with previous experiences (fishing with his dad in (Place), cooking and eating fish, having a pet fish, burying a pet fish that died). There was also an integrating of school and home life, that was unexpected. This was significant for Peter, but less so for Paul. Maybe these dualities (home vs school, parent vs teacher, previous knowledge vs new information, inward vs outward facing) are also part of the tensions of learning, that Short talks about. Some of them were planned, and others were an unexpected part of the context.

Those are my musings on implementing the cycles of inquiry with Peter and Paul at home. I hope it is helpful primary data! Could you create a survey for parents to find out how the projects were implemented at home, to investigate the home vs school, parent vs teacher integration, collaboration and learning? How much involvement did parents have? Did the students resist? Maybe the flipgrid videos could be part of your data?

Anyway, good luck and hope it all comes together!