Recognising Beach Kindy as a pedagogical approach for *critical agents of change* within early childhood education.

Diane Boyd

School of Education

Liverpool John Moores University

Liverpool, United Kingdom

Email: d.j.boyd@ljmu.ac.uk

Nicky Hirst

School of Education

Liverpool John Moores University

Liverpool, United Kingdom

Email: n.j.hirst@ljmu.ac.uk

Abstract

Research (Davis, Elliot, Hagglung, Johansson, Ritchie, Miller, Inoue, Chua, Sageidet, Young, Cutter-Mackenzie, Ji, Stuhmcke, Mackey, Ohillips, Enggahl, Arlemalm-Hagser, Barrat, Barrat-Hacking, Black, Chawla, Rivkin, Gorman, Sundberg, Ottander, Gilbert, Fuller, Palmer, Rose, Farrell, Danby,2014) has indicated that very young children are capable of supporting the Agenda for Global Action through transformative and creative pedagogical approaches utilised through their environments, that are informed and practiced by knowledgeable early education practitioners and leaders. The early years offers multiple

opportunities to surround young children with the awe and wonder of their world, linking to their local cultures, as they seek to question, challenge and access possibilities to transform their families and communities.

Beach Kindy utilises the natural environment of the coastline, at sites that demonstrate the biodiversity of the planet. Water, for example, is recognised not only as an effective medium and tool for education *for* sustainable development but also its immense capacity to support holistic, interconnected areas within early childhood education. However, it is acknowledged that this approach is not without challenges. The four home nations that make up the United Kingdom (England, Northern Ireland Scotland and Wales) have distinct early years curriculum frameworks and this paper focuses on the English framework, The Early Years Foundation Stage (The Department of Education (DfE) 2014).The DfE (2014) imposes what is perceived by many as a linear statutory framework and policy makers must try to move towards embedding education *for* sustainable development and encourage more flexible, creative approaches to learning.

The English Early Years Foundation Stage (EYFS, DFE, 2014) statutory guidance, focuses on three Prime areas, (Communication and Language, Personal, Social and Emotional Development and Physical Development and four Specific areas including, Understanding the World (UW). This Specific area (UW), presents a renewed emphasis on a 'concentric approach to learning' (Tickell, 2011, p.104) where children are guided to 'make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment' (DfE, 2014, p8). Children can become young scientists, utilising the coastlines and becoming "ocean literate". Early education Practitioners can thus provide "a platform to channel their infinite capacities for activism into the creation of a better world." (2015, p.12).

This paper seeks to explore how Beach Kindy can help implement both the Sustainable Development Goals and the scientific approaches embedded within UW, whilst also recognising the challenges that it may bring.

Keywords:

Education for Sustainability; Early Childhood Care and Education for Sustainable Development; ECCESD, Beach Kindy; Ocean Literacy

Introduction

Sustainability is defined in the Brundtland report - *Our Common Future* (1987 p. 41) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The report highlighted the need for awareness around the "so called free goods like air and water" and that "sustainable development requires that the adverse impacts on the quality of water, and other natural elements are minimised so as to sustain the eco systems overall integrity" (1987, p. 43). Furthermore, the scientific importance associated with the ocean was characterised in 'the earths wheel of life" (1987, p. 217) and more recently in the Ocean Literacy Framework (2002-2010,2013) and the Ocean Literacy Framework UK and Europe (Savage, 2014), for providing balance and sustaining the earths vital life support systems. In 1996, Elder (p. xxii) noted how "a balanced ecological identity encompasses both scientific awareness and reverence for the processes of life, both personal stories and the responsibility of a citizen". The idea of world citizenship was considered in the Brundtland report (1987, p. 9) with recognition that all "citizen groups" should, and must play an "indispensable role in the creation of public awareness" around sustainable development. The authors postulate the value of transformative education when working with young children,

as one of these citizens groups, exemplified by Davis' (2014) assertion that early childhood education has a vital role to play in "societies' transitions to sustainability" (2014, p.21). She comments that young children are citizens within "an expanded rights framework" with a focus on "foundational rights, as promulgated by the UNCRC, agentic participation rights, collective rights, intergenerational rights and bio-ecocentric rights" (Davis, 2014, p. 23). 1987 was also the European Year of the Environment which coincided with the development of the European Blue Flag scheme for beaches. This blue flag idea was later adopted by the Foundation for Environmental Education (FEE) which developed the International Eco-School Programme to support the implementation of the key aims and objectives of the Earth Summit 1992.The Earth Summit recognised the need for all citizens to recognise "new forms of participation" especially in regard to decision making "which potentially affect the communities in which they live" (1992, p. 270). This opens up the possibilities for young children to be recognised as agentic citizens. Additionally, in 1991 most countries of the World signed the United Nations Convention on the Rights of the Child, which established children as participants in decision making on matters that affect them. However, Strang, DeCharon and Schoedinger (2007) argue that the development of scientifically literate citizens is not enough as children need to be familiar with "ocean issues that may or may not be happening in their own backyards" (p. 7). The Ocean literacy framework (USA, 2002-2010) was devised to readdress the lack of ocean related content in science education and the Ocean Literacy framework (UK and Europe, Savage, 2014) cites how an ocean literate child "is able to make informed and responsible decisions regarding the ocean and its resources" (p. 1).

At the Johannesburg World Summit on Sustainable Development (2002, p.6) there was a "collective determination" to highlight not only environmental concerns but wider issues that had previously been neglected. Moreover, the Declaration noted how "the children of the world

spoke to us in a simple yet clear voice, that the future belongs to them" (p.7). The Declaration recognised the need to manage and protect the earths' natural resources, "ensuring the sustainable development of the oceans requires effective coordination and cooperation" (2002, p.30). The authors highlight the Ocean literacy framework: UK and Europe (Savage, 2014) as a useful pedagogic tool to build coherent and conceptually sound scientific learning experiences for young children. Whilst this framework is noted as an instructional tool, it shows how educators can help learners build their understanding of the seven Ocean literacy principles. The guidance can be considered by early childhood educators with an emphasis on the Characteristics of Effective Learning noted in the EYFS (DfE, 2014). These characteristics highlight *how* young children learn, through playing and exploring, active learning and creating and thinking critically (DfE, 2014, p9). This paper explores an integrated holistic approach to sustainability through "sustainability science" (Clark, 2003 p.3). UNESCO highlight the power of social transformation as a driver of environmental change and clarify it further as "science *about* sustainability" and "science *for* sustainability." It defines science about sustainability as understanding "how complex physical, biological and social systems function", whilst science for sustainability is "to support sustainable policies and positive social transformations" (UNESCO). Wals and Leij (2009, p18) highlight that the challenges of transforming societal sustainable change are complex and require a new type of thinking. They advocate that applying a "routine problem-solving approach falls short" and instead emphasise that "transitions require a more systemic and reflexive way of thinking and acting with the realization that our world is one of continuous change and ever-present uncertainty." By strategically utilising the principles of "co- learning" (collaboration, team work, democratic dialogue) and sharing knowledge across disciplines (science is one) will effectively build capacity in three key areas: "critical evaluation of existing knowledge and problems, knowledge generation and penetration, and application of this new knowledge to policy,

practice, and everyday life." (Glasser,2009, p52). The involvement of challenging of diverse views and disciplines should ultimately encourage "building a common language, transparency, tolerance, mutual trust, collaboration" (Glasser, 2009,p52) and to a more sustainable future. Indeed, Wals, Brody, Dillon and Stevenson (2014) highlight the potential for a convergence of environmental education and science education. The interdependency of an ethical foundation recognised in the Earth Charter Initiative (2012) is mirrored in the principles of the Ocean Literacy framework promoting the four dimensions of respect and care for the community of life; ecological integrity; social and economic justice and democracy, nonviolence and peace. UNESCO and the International Oceanographic Commission is developing a learning tool utilising the seven essential principles of the Ocean literacy framework too. It aims to "sensitise and enable" educators to develop marine citizenship. In September 2015, the new sustainable development goals included recognition of early childhood education, however this is framed within the paradigm of 'readiness' for primary education (SDG 4; target 4.2) and caring for the ocean and its ecological systems (SDG 14).

The Foundations of Early Childhood Education

Barratt, Hacking and Black (2014) highlight that the open air schools' movement in the 1900's was a response by early years pioneers, such as Margaret and Rachel McMillan, to public health issues and this emphasis on outdoor provision resonates with current early years practice. The Global Education Monitoring report (2016, p.41) suggests the need for a "shift from a view of child development based exclusively on health related indicators". However, historically the pioneers of the Kindergarten philosophy for example, Pestalozzi and Froebel, were grounded in science and nature (Joyce, 2012). In England early childhood pedagogy is

founded on the belief of child centred and self- directed learning (Kwon, 2002). Whilst the sociological idea of agency is considered within Education for sustainability, the idea of children as agentic in their own learning was captured by Pestalozzi who evoked the notion of child self- activity or sensorial learning. In this context the role of the teacher was seen as a mediator who linked learners through their senses with the outside world. Dewey's theory of experiential learning is captured by Horvath, (2016, p.26), where young children learn, "not through being mechanically drilled in prefabricated material, but by doing work, experimenting with things, and changing them in purposive ways". Dewey's philosophies can be seen in current practice with young children, especially in terms of engaging in field trips and longitudinal community based projects, where young children become familiar with their local environments.

In England and elsewhere, play is an integral element of the curriculum, founded on the belief that children learn through child initiated learning (Jarvis, Brock and Brown, 2014). In 1967, the Plowden report (CACE, 1967) gave play a strong endorsement noting that within play "children gradually develop concepts of causal relationships, the power to discriminate, to make judgements, to analyse and synthesize, to imagine and formulate" (p. 193). This discovery learning is exemplified by Oates and Grayson (2004) who consider how reproductive learning is comparable to learning facts but generative knowledge allows children to come up with answers for things that they have not been taught. Witt and Clarke (2015, p. 131) consider the power of an Eco-playful early childhood pedagogy as this takes "a more hopeful perspective, inviting openness and honesty" (p. 132) with dialogue with young children. Elliot and McCrea (2016) draw interesting parallel developments associated with the emergence of theories around the new the sociology of childhood (Corsaro 1997),

that viewed young children as social participants and the promotion of children's rights to participate in decision making about matters that affect them (UNCRC, UNICEF, 1989).

In 2009, Davis conducted a literature review of research centred on Early Childhood Care and Education for Sustainable Development; (ECCESD), where she highlighted an extensive research hole with a lack of research around this area. She explored the research in this domain with a distinct rationale for the compartmentalised results, with studies focusing on young children's relationships with nature noted as "education in", and research related to children's understanding of environmental topics as "education about". The void was most prominent with "education *for"* which is defined within the sociological concept of agency. Davis (2014) also highlights Education for Sustainability as a "relatively new field that has become a global movement in the space of a decade" and those working and researching within early childhood education are cognisant of the need for international dialogue to "strengthen the argument for investment, research and action" (Davis, 2014: forward). This is further substantiated by Hedeflak, Almqvist and Ostman (2014) who highlight the 1990's as a period where explicit connections were made between early childhood education and environmental education with a swathe of research related to children's engagement *in* and *about,* with little recognition of children acting as agents of change. Models of participation have gradually developed, for example Hart's (1996) depiction of a ladder notes different degrees of participation starting from manipulation of children by adults to authentic child initiated shared decisions *with* adults. Beach Kindy offers opportunities for adults to co construct different meanings with children, thus "higher rungs of the ladder, carry the potential for creative transformation from the grass roots up, which is essential to ecological sustainability" (Chawla 2002, p3). An alternative model of participation is presented by Shier (2001) with five pathways to participation, acknowledging the need to meet a minimum

threshold (noted as level 4), where children are involved in decision making processes to endorse the United Nations Convention on the Rights of the Child (UNCRC, UNICEF, 1989). His argument for involvement beyond level 4, notes the need for children to share power and to be encouraged to take responsibility for decision making. Indeed, it is not mandatory within the UNCRC for adults to allow children to share power, merely to seek children's views, however, the pedagogy associated with Beach Kindy offers a sensitive platform for reciprocal, authentic communication. Davis (2014) expands and consolidates the view of young children as capable agents of change with her argument for revisioning rights to "extend to include collective rights, intergenerational rights and rights beyond those held by humans" (p. 22). This focus on Anthropocene is captured within the case study and Davis (2014) notes that within the context of Early Childhood Education "Eco-centrism goes one step further, also aligning value to the Earth's entire eco system, including elements such as carbon, air and water and their interdependent cycles" (p.30). Davies et al, (2014, p.7) highlight, "the younger the child, the greater the emphasis needs to be placed on the procedural, 'doing' aspect, in comparison with the conceptual components of scientific learning". They further argue that these elements cannot be separated, as for young children the *doing* and the *knowing* are fundamentally the basis of scientific attitudes. There is a distinct correlation between the Characteristics of Effective Learning (C of E L) within the Early Years Foundation Stage (DfE, 2014) with emphasis on *how* young children learn. Elliot and McCrea (2016) recognised children as active participants with a focus on health, wellbeing and the benefits of outdoor environmental education, and a research report by Natural England (2012-2016) highlights the need for intentional interactions with nature as a positive pedagogy with "learning that takes place in a natural environment resulting in, or associated with a range of positive outcomes for learners of all ages" (2016, p. 4).

Elliot and McCrea (2016) illustrated how many practitioners were astounded by the complex knowledges that young children often demonstrate and they question "the romanticised notions of children in nature may be thwarting more challenging and deliberate pedagogical discussions" (p.21). Whilst there is a swathe of research related to environmental/outdoor learning and the Forest school philosophy, the authors note an extended void in the research related directly to the use of coast lines and beaches, with Beach Kindy notably absent. This absence also relates to the cognitive benefits of alternative pedagogies.

The English Early Years Foundation Stage

Opportunities for ECEfS are not explicitly specified in the English Early Years Foundation Stage statutory framework (Boyd, Hirst, Sageidet, Weldemariam, Grogan, Hughes and Browder, 2016), however, settings can provide outdoor natural play curricula that focus on children's interests in sustainability (Barratt, Barratt-Hacking and Black, 2014). A theme resonating from the tenth anniversary of the Cambridge Primary Review, highlights global learning and sustainability as a vital element of early childhood education in the primary years. Bourn, Hunt Blum and Lawson (2016) assert "the need to develop approaches to learning which promote children's engagement, empowerment and a sense of agency with regard to their present and future lives as global citizens" (2016, p. 13). However, in 2006 Andreotti coined the term 'soft' approaches to global citizenship, for example charity fund raising with children. She suggested that, whilst this approach emphasises a moral concern related to global issues, such as poverty and inequality, there is also a need for a 'hard' lens, where issues around social justice have a notably longer term impact. Beach Kindy offers an alternative, "concentric approach" (Tickell, 2011, p. 104) where children are submerged in an ever changing natural environment whilst developing "process skills" (Evangelou, Sylva, Kyriacou, Wild and Glenney, 2009).

The Early Years Foundation Stage (EYFS, DfE, 2014) highlights three prime areas including personal, social and emotional development, physical development and communication and language. The four specific areas include 'Understanding the world' which involves "guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment" (DfE,2014 p. 8). Education for sustainability highlights the need for children to understand community within the paradigm of global citizenship with recognition that our actions have an impact on the environment. The characteristics of effective learning (DfE, 2014), note how children learn to concentrate and keep on trying if they encounter difficulties and enjoy achievements. Creating and thinking critically is essential and children need to be encouraged to develop their own ideas, make links between ideas, and develop strategies for doing things. Wilson (2011, p. 2) highlights the Vygotskian and Montessori notion of critical and sensitive periods during child development. She suggests that these critical periods offer "heightened susceptibility to acquiring understandings and skills impacting life- long attitudes, values, and competencies." This resonates with Tilbury (1994) who suggested that these critical periods in early childhood can determine the subsequent development of an "ecological self" (1994, p. 4).

Using Beach Kindy as a pedagogical approach for ESD

Beach Kinder is a familiar term within Australian Early Childhood Education and various terms capture the use of physical and cultural spaces used within the early years, for example, nature kindergarten, bush kinder, farm kinder. The literal translation of kindergarten meaning the *garden for children* is an idealistic metaphor for outdoor provision for young children to engage with nature (Joyce, 2012). The English Beach Kindy approach uses the coastline and

associated environment, as a pedagogical tool of ocean interconnectedness and adopts the principles of the world renowned Forest school philosophy which encompasses essential elements, such as use of the environment, which is visited over a prolonged period of time and the qualification, knowledge and understanding of the early childhood practitioner. The specific forest school training combines practical and theoretical knowledge so that adults and children work together in a reciprocal way to consider the ecological impact assessments of the environment (forest or beach). Of equal importance is the immersive longevity of the approach, where regular visits are conducted over an extended period, which allows children to become familiar with the area and develop a sense of ownership for the environment (Welsh Assembly, 2009, p. 8). Barratt, Barratt-Hacking and Black (2014) develop this further and argue for the need for young children to explore both familiar and unfamiliar environments in order to challenge and develop meta-cognition and critical thinking. The argument for extended periods within a natural environment, also allows adults to build trusting and secure relationships with young children and provides a platform for scientific conceptual development which goes beyond the learning of facts or procedures.

Within Beach Kindy pedagogy, children interact with the physical environment, however the Piagetian concept of the lone scientist, where children discover by themselves, is developed within a socio cultural framework of learning, where conceptual change is a social process (Oates and Grayson, 2004). Hedeflak, Almqvist and Ostman (2015) argue that there is often a belief by early years' educators that children will simply become agents of change if they are given environmental knowledge and learn facts about sustainability, however, children need to learn how to respond to issues in what they call a "socio-critical" (p. 985) dimension to the pedagogy. Contemporary research has revealed that interpersonal conflict, especially with peers, might play an important role in promoting cognitive change. Elliot and McCrea (2016)

highlight the complexities of purposefully framed play as a highly effective approach for ECCESD (2016, p. 86), and this idea of intentional teaching and place based learning is "premised upon the interactions of people with their locale" (Barratt, 2014, p. 231). Indeed, England, as part of Great Britain, is an island nation with dramatic coastlines, rivers and estuaries which connect all inhabitants to the ocean.

The Global Education Monitoring Report (2016) highlights the need to "train and support teachers to enable learners to acquire green skills' (p.188) and SDG 4.7 of the sustainable development goals highlights the target, that by 2030, "all learners acquire the knowledge and skills needed to promote sustainable development" (4.7) juxtaposed with a substantial "increase in the supply of qualified teachers" (4.7c). Barratt, Barratt-Hacking and Black, (2014) capture the English context and note how the "demise" of the sustainable schools' framework (p.231) makes this difficult to justify in an education system focused on goals and targets. Moss (2007) notes early childhood as a site for democratic spaces to discuss serious issues with young children in appropriate ways. The notion of ocean literacy, embedded in an early years' context as Beach Kindy, contributes to SDG14.a, where early childhood educators reach beyond physical interactions within the beach environment, to "an increase in scientific knowledge". This is recognized in SDG 14 thus, "Our rainwater, drinking water, weather, climate, coastlines, much of our food, and even the oxygen in the air we breathe, are all ultimately provided and regulated by the sea" (SDG 14a).

The UNESCO Global Education Monitoring Report (2016) focuses on the 2030 goals and the summary notes the urgent need for new approaches. Beach Kindy as a pedagogical tool for ECCESD, builds upon the ethos of Sandwatch (UNESCO 2010) and "embodies the

principles of education for sustainable development and serves as an excellent example of the new and innovative approaches to the kind of education essential for an effective global response to climate change" (p. 4). A repertoire of pedagogical approaches are suggested which Sandwatch noted as "a programme through which children, youth and adults work together to scientifically monitor and critically evaluate the problems and conflicts facing their beach environments and then design and implement activities and projects to address some of those issues, whilst also enhancing the beach environment and building ecosystem resilience to climate change" (p.9). Hedeflak et al (2015) and Davis (2009) suggest that early childhood educators often avoid using nature as they consider the physical dangers for children. Additionally, Duhn (2012) suggests that educators see young children as vulnerable and innocent and therefore in need of protection from harsh realities. Beach Kindy consolidates the positive ethos of the Blue Flag award. Blue Flag is a voluntary eco programme that offers practitioners suggestions of how to incorporate environmental awareness into practice through environmental activities associated with sustaining beaches and mariners. "This means that environmental education is not just concerned with spreading messages about the environment, but it also provides opportunities to enhance learner understanding, question environmental problems and take action for environmental change in pursuit of sustainable development" (2013, p. 3).

Research Context

The authors have ethical approval for a project to work with practitioners, parents, childminders and children from two early year's settings on the Wirral, due to commence in January 2017. Place based learning is considered as a pedagogical tool with sustained visits to the local beach. The authors engaged in a pilot phase of the research project during August 2016 and embraced the philosophy of observer participants alongside, two parents, park

wardens, and four children aged between 3yrs.6mths and 4yrs.6mths. Two aspects of the case studies are presented to offer a flavour of the pilot phase of the project based inquiry utilising the Ocean literacy framework: UK and Europe (Savage, 2014) which is highlighted as a useful pedagogic tool to build coherent and conceptually sound scientific learning experiences for young children and develop attitudes that foster advocacy for the earth. The purpose of the pilot study was a precursor to the main project where parental perspectives were sought to develop the project during the winter. The use of the beach supported a playful and exploratory lens where children were able to discuss critical scientific issues regarding their local beach, thus acting as potential agents of change within their family and community.

Methodology

Beach Kindy also builds on the philosophy and methodology of Sandwatch (Monitoring, analysing, sharing and taking action) and the concept of Water school, noted by Horvath (2016), utilising an early education lens with observation, documentation, inquiry and investigative approaches to scientific learning (Davies, Howe, Collier, Digby, Earle & McMahon, 2014), with an emphasis on early childhood education as a site for socio-critical explorations. The tradition of pedagogical documentation as an ethnographic research model in education began to emerge in the 1970's adopting some qualitative methods from sociology and anthropology (Wein, 2011). In the early years, a meaningful starting point is from a project based approach and time was a significant factor to enable dialogue and reflection between research stakeholders.

Stuhmcke (2015, p.245) highlights from an ECCESD lens, "a transformative project

approach facilitates children's capabilities in relation to environmental and sustainability issues." The teacher should advocate the co- constructivist theoretical approach or as Rinaldi (2006, p.126) states a revision of a teacher as a transmitter of knowledge and culture, but as a co-creator. This involves "constant hypothesizing" on possible developments and "listening, observation, documentation and interpretation." Pedagogical documentation is a fruitful and holistic pedagogy within early childhood education and builds upon a collaborative question or inquiry between early years' educators, teachers, children, or others, about the learning of children. It reflects a disposition of not presuming to know, and of asking how the learning occurs, rather than assuming, as in transmission models of learning, that learning occurred because teaching occurred. In essence, the Beach Kindy approach reflects what Rinaldi describes as "learning made visible" or "visible listening" (2006, p. 100).

Case Study

Wirral's Wonderful Waders and Big Seaweed Search

Every autumn and winter, wading birds in their thousands come to the Dee Estuary and the coast of North Wirral to feed on the rich diversity of food to be found on and around the mud and sand of the estuary and beaches. The different lengths and shapes of their bills are used for different types of food, most of them feed on molluscs and worms in the mud. The Dee Estuary and North Wirral coast have been designated internationally important *Sites of Special Scientific Interest (SSSI).* At times of high water, the birds are forced to retreat to the top of the beaches where they roost, waiting for the tide to go out. If they are forced to fly, they use up vital energy reserves, which in the cold winter months, can be dangerous for

them. The roosting wading birds are particularly vulnerable to disturbance from walkers, dogs and horses (Wirralcountrypark@wirral.gov.uk).

During the pilot phase, Beach Kindy was promoted as an explicit approach to support Education for sustainability, including an examination of ethical dilemmas and scientific inquiry. Kuhn (2004) considers how scientific inquiry based approaches are not merely about children interacting with materials as this is insufficient for the development of process skills including observation, raising questions, hypothesising and predicting. In this sense, the Beach Kindy pedagogy offered opportunities for young children to investigate the properties of the beach (and associated detritus), whilst debating some complex issues, including the notion of rights. Who owns the beach? Why do the birds need to be protected? The Wirral estuary and coastline is also home to a wide variety of seaweeds and plant life and children were familiar with the beach as part of their local cultural identity.

The research group (parents, children, wardens and the authors) were able to engage in some interesting conversations around ownership and responsibility, and patterns emerged related to personal perspectives and lived experiences. Two of the children were familiar with dog ownership and regularly used the beach to walk their dogs with their parents and conversations with the wardens opened up new perspectives in terms of rights. The Beach Kindy pedagogy embraced the social cultural aspect of dialogic teaching (Alexander 2008) and offered opportunities for discussion and debate whilst supporting an interpretation of the theoretical elements of democratic agonism (Mouffe 2000). Beach Kindy offered a contextualised *place* for contesting and challenging critical issues centred on the child's locality and during the pilot, the parents were impressed by the developing sophistication of

their conversations with the children gleaned from sketches, photographs and verbal communication.

"*The birds live in the sky and on the beach and Frankie (name of dog), lives at home with us"* Jenson aged 3yrs 6mths

"*We have to be careful when the birds are feeding and keep Harvey (name of dog) on his lead"* Finley aged 4yrs 6mths.

Parents interjected with comments around rights and how they were focused on the needs of their pets and conversations supported different ways of seeing the issues. In this sense, the Beach Kindy embraced the early years' curriculum with an acknowledgement that they (young children) were trusted to make decisions and engage in some complex issues surrounding an 'Understanding of [their] world' (DfE, 2014). Indeed, Beach Kindy offered a participatory, action based pedagogy focused on real life issues of relevance to young children (Davis, 2015). This is underlined by Rinaldi (2006, p.156) when she states that in early childhood there must be an acceptance of "conflict as part of dialogue" when considering critical and ethical tensions and issues.

As part of the project approach, the parents and children worked with the wardens to sort and classify the different native seaweeds found in a section of the beach, providing rich descriptive language of the characteristics of the varieties. For example, Serrated Wrack is tough, with toothed fronds and olive brown in colour and is found growing on the rocks. In contrast Bladder Wrack and Knotted Wrack have bladders not fronds and the bladders on the Knotted Wrack are difficult to pop. These differences generated the 'why' and 'how' questions necessary for scientific thinking and investigation. For example, why is the Knotted Wrack difficult to pop? These observations were documented in a shared thinking book and

the children took photographs which they later used to prompt further discussion.
With the help of the wardens, the parents and children were able to document and use the correct terminology and Lemke (1990) highlights the importance of children needing to learn to use the specific scientific language and to be able to make casual connections.

"*This is great stuff, I wouldn't have considered using the terminology with Finley, but I can see he is fascinated and I'd like to learn more about this"*
Parent

However, the purpose of the research was not just to highlight species but to recognise and understand their importance within the ecological system. Ecologically, seaweed impacts upon the community in many ways, for example, it creates underwater habitats for thousands of sea creatures and it protects our coastlines from storm damage. Research (Natural History Museum) suggests that there has been a 2°C increase in sea surface temperature around Britain over the past 40 years. The data suggests as a consequence of this rise, that cold water seaweeds are now having to move even further north and that the distribution of warm water seaweeds is expanding because of rising sea temperature. Beach Kindy provides an opportunity for children to understand and connect to their world, to love and respect the earth, and through this Wilson (2012, p.87) notes how this "develops the essence of an environmental ethic." Rising sea temperatures and climate change resonates with principle six of the Ocean Literacy Framework: UK and Europe (Savage, 2014) and these issues become real and children can see it impacting locally and in a real life context.

Conclusions and challenges

This transformative project approach in Beach Kindy can develop both locally and internationally with settings and schools linking up and creating maps of seaweed and wading birds around their islands and coast lines. This aligns Science and technology as mutually supportive and interconnected disciplines. Science requires children to test, analyse, question knowledge, whilst technology supports children to feel empowered to advocate for their world. Davies et al (2014, p.10) suggest that "science is a desire for understanding "(Why are the seas getting hotter? Or charting the arrivals of new species of seaweed and considering the impacts of the change) "Whereas for technology it is some improvement in our physical environment." (How can we make subtle changes that help climate change? How have other communities made changes that have impacted locally?) These complex issues become meaningful and the children can begin to see and understand how climate change and the notion of rights are impacting on their local and global environment and community.
Beach Kindy also resonates with the Ocean Literacy framework: UK and Europe (Savage, 2014) and highlights (Principle six) which states the "oceans and humans are inextricably interconnected" and this also connects to both SDG 4 and SDG 14.

The Global Education Monitoring Report (2016) highlights that education as usual cannot continue and this resonates with Davis (2015) who notes how, even within early childhood education, it cannot be "business as usual" (p. 21). The Report (2016, p.186) asserts that "schools need to be exemplary places that breath sustainability" and the discourse around education for sustainable development has resonated within the dominant frame of school as the primary institution for sustainable education. With its child centred historical roots, Early Childhood Education is a sound platform for Education for sustainability and the research in

the field has developed with a number of early childhood practitioners who have driven the uptake of ECCESD. Davis and Elliot (2015) are cognisant of the need for "a more scholarly eye to what is being enacted and to explore approaches and practices more deeply and critically" (2015, p. 2).

Education for sustainability transcends the messages situated in any early years' statutory framework and the English Early Years Foundation Stage (DfE, 2014) fails to embrace and utilise the cultural identity within the English coastline. Whilst there is no explicit reference to scientific thinking within the framework, Beauchamp (2013) argues for a cross curricular lens and Evangelou et al (2009) note scientific inquiry as a particular form of discourse. Ang (2014, p.16) notes the unintended consequences of an over prescriptive curriculum may be to 'silence' the child and this also resonates with Malaguzzi's idea of a prophetic curriculum (Cagliari et al 2016); a curriculum that predicts what will happen even though the future is based on uncertainty, variability and change. On another note, the discourse of the Early Years Foundation Stage (DfE, 2014) reflects school readiness. This has developed with the increase in early intervention strategies, in alternative 'stories', in the "game of assessment" (Basford & Bath, 2014), thus, contesting the narratives related to the purpose of early childhood education (Moss, 2014). Furthermore, there are discussions on whether, and to what degree, the EYFS (DfE, 2014) considers children's point of view and how the framework supports young children to develop their own "human sense" (Donaldson, 1978) of the world around them. Whilst learning *in* and *about* the environment is embedded into early childhood education, learning *for* the environment helps to lay the foundations for sustainability and to encourage children to explore human/environment interactions as causal in sustainability problems and aspects (Davis, 2009). Very young children have been found capable of sophisticated thinking in relation to socio-economic aspects and the earlier ideas

are introduced, the greater their impact and influence can be (Siraj-Blatchford, Smith, & Pramling, Samuelsson, 2010). Horvath (2016) notes the ecosystems of water school and provides tacit reference to ECCESD with the assertion that it is important to "keep the habitat healthy and to understand how to sustain them for hundreds of years" (2016, p. 13), however within the context of the 2030 Sustainable development goals, a transformative agenda of education for sustainability must take precedence for global sustainable futures (Davis and Elliot, 2015) and we advocate Beach Kindy as a pedagogical approach to achieve this.

References

Alexanda, R. (2008) *Towards Dialogic Teaching; Rethinking Classroom Talk.* 4th Ed Osgoodby: Dialogos.

Ang, L. (2014). *The Early Years Curriculum; The UK and beyond.* Oxon: Routledge.

Andreotti, V. (2006) 'Soft versus critical global citizenship education'. Policy and Practice: A Development Education Review, 3: 40-51.

Barratt, Barratt-Hacking and Black, 2014 chapter 14 Innovative Approaches in Davis, J. and Elliot, S. (2014) *Research in Early Childhood Education for Sustainability: International perspectives and provocations.* London Routledge.

Basford, J. and Bath, C. (2014). Playing the assessment game: An English early childhood education perspective In Early Years. *An International Research Journal, 34 (2) DOI: 10.1080/09575146.2014.903386*

Beauchamp, G. (2013) *Understanding the World. Chapter 20 in* Palaiologou, I. *The Early Years Foundation Stage: Theory and Practice.* London Sage. Pp 286-298.

Big Seaweed Search

Available at - http://www.nhm.ac.uk/content/dam/nhmwww/take-part/Citizenscience/seaweed-survey/big-seaweed-search-guide.pdf

[Accessed on 3/10/2016]

Blue Flag Programme Environmental Education Activities Handbook 2013

file:///C:/Users/Diane/Downloads/EEA+Handbook+2013+BEACH%20(1).pdffile:///C:/Users/Diane/Downloads/EEA+Handbook+2013+BEACH%20(1).pdf

[Accessed on 30/09/2016]

Boyd, D. Hirst, N. Sageidet, B.M. Weldemariam, K. Grogan, L. Hughes, F. and Browder, J.K. *A Comparative Study of Early Childhood Education for Sustainability (ECEFS) from England, Sweden, Norway, Australia and the USA; (Re) searching education for sustainable development within early childhood curriculum frameworks.* Paper submitted for publication (2016)

Clark, W.C. *Sustainability Science: Challenges for the New Millennium.*

Available online at

https://www.hks.harvard.edu/sustsci/ists/docs/clark_zicer_opening030904.pdf

Chawla, L. and Heft, H. (2002) Children's competence an Ecology of communities: a functional approach to the evaluation of participation. *Journal of Environmental Psychology* [online], v.22 (1-2), p.201-2016

Available at: http://www.sciencedirect.com/science/article/pii/S0272494402902446

[Accessed: November 2016]

Cooper, H (2004) *Exploring Time and Place Through Play Foundation Stage – Key Stage One.* London : David Fulton Publishers .

Corsaro, W.A. (1997) *The Sociology of Childhood.* Thousand Oaks, CA.: Pine Forge Press.

Davis, J. (2009). Revealing the research 'hole' of early childhood education for sustainaility: A preliminary survey of the literature. *Environmental Education Research*, 15(2), 227–241.

Davis, J (2015) *Young Children and the Environment. Early Education for Sustainability.* Melbourne: Cambridge University Press.

Davies,D, Howe, A, Collier, C, Digby, R. Earle, S and McMahon, K. (2014) *Teaching Science and Technology in the Early Years (3-7) 2nd Ed* London Routledge.

Department for Education (2014*) Statutory Framework for the Early Years Foundation Stage: Setting the Standards for Learning, Development and Care for Children from Birth to Five.*

Available at [*http://www.foundationyears.org.uk/eyfs-statutory-framework/*](http://www.foundationyears.org.uk/eyfs-statutory-framework/)

[Accessed 30/08/2016]

Dewey, J. (2012) *Democracy and Education: An Introduction to the Philosophy of Education.* Los Angeles, CA: Indo-European Publishing.

Duhn, I (2012). "Making 'Place' for Ecological Sustainability in Early Childhood Education " *Environmental Educational Research*. 18: 19-29

Elder, J. (1996) cited in Thomashow, M. (1996) *Ecological identity: Becoming a reflective environmentalist.* Cambridge Massachusetts MIT Press.

Foundation Phase- Outdoor Learning Handbook 2009

Available at - http://learning.gov.wales/docs/learningwales/publications/140828-foundation-phase-outdoor-learning-handbook-en.pdfhttp://learning.gov.wales/docs/learningwales/publications/140828-foundation-phase-outdoor-learning-handbook-en.pdf

[Accessed on 30/09/2016]

Global Education Monitoring Report (2016)

Education for people and planet: Creating Sustainable Futures For All.

http://unesdoc.unesco.org/images/0024/002457/245752e.pdf

[Accessed on 3/10/2016]

Good Beach Guide (2015)

Available at - http://www.goodbeachguide.co.uk/

[Accessed on 3/10/2016]

Hart, R. (1997) *Children's Participation. The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. London: Earthscan.

Hedefalk, M. Almqvist, J & Östman, L (2015) Education for sustainable development in early childhood education: a review of the research literature, *Environmental Education Research,* 21:7, 975-990, DOI: 10.1080/13504622.2014.971716

Horvath, J. (2016) *Educating Young Children Through Natural Water*; London; Routledge.

Joyce. R. (2012) *Outdoor Learning Past and Present.* Berkshire; Open University Press.

Kuhn,D (2004) 'What is scientific thinking and how does it develop', in Goswami (Ed) *Blackwell Handbook of Childhood Cognitive Development*, Blackwell.

Kwon, Y. (2002) *Changing Curriculum for Early Childhood Education in England;* Early Childhood Research and Practice; Vol 4 No 2

Life's a beach – programme New Zealand

https://www.boprc.govt.nz/residents/teachers/teacher-resources/lifes-a-beach-education-resource/

Lemke, J. (1990) *Talking Science: Language, Learning and Values.* Norwood, NJ: Ablex Publishing Corporation.

Moss, P (2007) *Bringing politics into the nursery: Early Childhood Education as a democratic practice;* European Early Childhood Research Journal Vol 15 Issue 1 pages 5-20

Mouffe, C. (2000) Deliberative Democracy or Agonistic Pluralism. *Political Science Series*, 72, pp. 1-17.

Natural Connections Demonstration Project, 2012-2016: Final Report

Available at http://publications.naturalengland.org.uk/publication/6636651036540928

[Accessed September 2016]

Ocean Literacy Framework

Available at http://oceanliteracy.wp2.coexploration.org/ocean-literacy-framework/

[Accessed 30/08/2016]

Ocean Literacy Europe and UK

Available at http://www.emsea.eu/ocean-literacy

Oates, J. and Grayson, A. (2004) *Cognitive and Language Development in Children.* Oxford; Open University Press.

Transforming our World: The 2030 Agenda for Sustainable Development**.**

Available at **http://www.un.org/pga/wp-content/uploads/sites/3/2015/08/120815_outcome-document-of-Summit-for-adoption-of-the-post-2015-development-agenda.pdf**

[Accessed 30/08/2016]

The Plowden Report (1987) Children and their Primary Schools; A Report of the Central Advisory Council for Education (England)

Available at http://www.educationengland.org.uk/documents/plowden/plowden1967-1.html

[Accessed September 2016]

United Nations Educational, Scientific, Cultural Organization –Learning to Live Together.

Available - http://www.unesco.org/new/en/jakarta/inter-sectoral/sustainability-science/

[Accessed on 30/09/2016]

United Nations Educational, Scientific, and Cultural Organization - Do you speak Ocean?

http://www.unesco.org/new/en/media-services/single-view/news/do_you_speak_ocean_unesco_develops_open_resource/#.V-5EpfkrLcc

[Accessed on 30/09/2016]

UNESCO. 2010. *Sandwatch: adapting to climate change and educating for sustainable development.* Paris: UNESCO. 136 pp.

Early Years Learning and Development Literature Review. Research Report DCSF-RR176

Available - http://www.foundationyears.org.uk/files/2012/08/DCSF-

[Accessed on 3/10/2016]

Tickell, C. (2011) *The Early Years: Foundations for Life health and learning* (Tickell review). London: DfE.

Tilbury, D. (1994). The critical learning years for environmental education. In R. A. Wilson (Ed.), Environmental Education at the Early Childhood Level (pp. 11-16). Washington, DC: North American Association for Environmental Education.

Wilson, R. (2011) Becoming Whole: Developing an Ecological Identity

Available at - http://ccie-media.s3.amazonaws.com/nacc/wonder_may11.pdf

[Accessed on 3/10/2016]

Wirral Country Parks .

Available at -Wirralcountrypark@wirral.gov.uk)

[Accessed on 3/10/2016]

Siraj-Blatchford, J., Smith, K., & Pramling Samuelsson, I. (2010). *Education for sustainable development in the early years.* Organisation Mondiale Pour l´Education Prescolaire (OMEP).

Tickell, C. (2011) *The Early Years: Foundations for Life, Health and Learning (Tickell review).* London: DfE.

Wals, A. E. J., Brody, M, Dillon, J., Stevenson, R.B. (2014) *Convergence between Science and Environmental Education: Science*; Vol. 344, Issue 6184, pp. 583-584

DOI: 10.1126/science.1250515

Wirral Nature Guide.

Available at http://www.visitwirral.com/dbimgs/naturebooklet_web.pdf

[Accessed on 3/10/2016]

National History Museum -Big Seaweed Search.

Available at -http://www.nhm.ac.uk/take-part/citizen-science/big-seaweed-search.html

[Accessed on 3/10/2016]

Visit Wirral - Official Wirral Peninsula Tourist Information

Available - http://www.visitwirral.com/coast-and-countryside

[Accessed on 3/10/2016]