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ARTICLE

Bush Kinders: Building Young Children's Relationships with the Environment

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Abstract
Early childhood is an important time for building children's affinity with nature and the environment. Early childhood professionals play a crucial role in developing young children's understanding of the natural world. Over the past 50 years, there has been a movement in early childhood education and care contexts to provide young children with the opportunity to learn in natural surroundings such as forest schools and nature kindergartens. This research, occurred in four bush kinders, an Australian example of nature-based, early years education influenced by the forest school approach to education. In this paper we interrogate key ideas concerning environmental education, drawing on seminal empirical research, guiding curriculum documents such as Australia's Early Years Learning Framework and government policy documents to build understandings of how children's play can be observed by educators who can then support the children to develop their understandings of the natural world around them. Through ethnography, a methodology that uses both participation and observation of research participants, it became apparent that young children's play-based learning offers opportunities for development of understandings of the environment. Applying a recent definition of environmental education from the US Environmental Protection Authority (2022), we analysed four vignettes which provide examples of educators and children's interactions supporting children to build an affinity with nature observed during the research. This research's implications are novel when considering the relatively new bush kinder approach to early childhood education as the findings remind us of the benefits of bush kinders in generating opportunities for young children's environmental education.

Keywords: Bush Kinder; early childhood education; environmental consciousness; ethnography; nature-based education

Introduction

Evidence suggests that a proficient method of building young children's connection with the environment is spending time in nature (Chawla & Cushing, 2007; Louv, 2008). Children's connections with the environment become stronger and their physical health and development, and their mental well-being, all benefit from time spent in nature (ACECQA, 2017; Knight, 2016). Time spent in nature-based early childhood education settings has been found to develop an "ethics of care" (Siry et al., 2023). One method found to support children's appreciation of the environment is to facilitate play-based teaching and learning opportunities in underdeveloped parklands, forests, and beaches (Harvey et al., 2020; Knight, 2016; Warden, 2010). There has been a well-documented approach to young children's environmental education via increasing numbers of forest schools and nature kindergartens throughout Europe, the UK, and

Northern America (Sackville-Ford & Davenport, 2019). These places of children's learning in the outdoors do not simply provide access to nature but, once artificial and synthetic implements for play such as toys and balls are removed, encourage children's understandings in many aspects of biology, ecology, and environmental knowledge and skills (Speldewinde, Kilderry, & Campbell, 2023).

Nature play, a form of play that is specifically unstructured and nature-based (Cutter-Mackenzie et al., 2014; Knight, 2009) which is influenced by the teaching approach adopted by educators, supports children's deeper understandings of the environment (Speldewinde, 2022). Nature play is "not just any type of outdoor play . . . (it) involves playing *with* nature, not just *in* nature" (Wilson, 2018, p. 12). Sites where nature play occur take on different forms that can include paddocks, reserves, forests and beaches. The forest school approach to early childhood education and care has been adapted to Australian circumstances and increasing numbers of Australian nature kindergartens (often known as "bush kinder") are appearing. Bush kinders began to appear in the context of Australian early childhood education in the early 2010s and the Australian Broadcasting Corporation (ABC, 2021) reported that over 150 sites existed in 2021. They form part of the four-year-old kindergarten programme and, with consideration for local weather conditions and local plants and animals (Christiansen, Hannan, Anderson, Coxon & Fargher, 2018), give four- to five-year-old children the opportunity to develop greater understandings of care for the environment. Nature play in bush kinders allows educators to observe what children learn through play and supports the development of children's "ecological identities" (Wilson, 2018, p. 102).

Through the application of ethnography (Delamont, 1992; Madden, 2017) this paper demonstrates that by allowing children to learn through play in nature settings, children gain a deeper understanding and appreciation of the environment. Additionally, this paper highlights the critical role that educators play in nature settings through applying their knowledge of the environment by scaffolding and supporting children's learning at point of need. The language of "environmental education" is subject to contestation. Inoue et al., (2019, p. 22) indicate that terms like environmental education are "complicated, and understood differently by governments, researchers, and the general public, as well as between regions and nations." Here we define environmental education using a definition from the Environmental Protection Authority of America as we believe it provides a structure upon which we can deepen our understandings of how environmental education occurs in nature-based early childhood education settings. It is the application of the EPA America definition of environmental education to a bush kinder context that make this paper novel. By defining environmental education in early childhood education, we can analyse these vignettes and make an argument for the merits of bush kinders and other, similar nature-based contexts of early childhood education as valuable in building children's understandings and appreciation of the environment. The paper will focus on Australia's Early Years Learning Framework (EYLF) (DET, 2019) learning outcomes that pertain to learning in the environment. The EYLF is a foundational document designed to articulate how educators can deliver quality teaching and learning in early childhood education and care settings for children's education from birth to school commencement. This Framework has at its foundation children's learning through educator practice; a set of principles which incorporate equitable, respectful, and reciprocal relationships with families; and learning outcomes. The EYLF is of use to this study as it is the guiding document for early childhood educators. The EYLF (DET, 2019) indicates that outdoor learning spaces enhance children's appreciation of the environment through its Outcome 2, that aims to connect children with, and contributing to their world. This paper responds to the research question of how educators and children experience environmental education in early childhood nature-based education contexts such as bush kinders.

Environmental education in the early childhood education

Environmental education has been viewed as a "vehicle to examine issues associated with the role of content in early childhood education" (Cutter-Mackenzie & Edwards, 2014, p.129). In addition,

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environmental education should "develop, broaden and transform the community's knowledge, skills, and intrinsic motivation to engage in sustainable behaviour and encourage participation in protecting the environment" (NSW Department of Planning and Environment, 2023). How does this translate for young children? Environmental education has been recognised as "representing a core educational concern in the twenty-first century" (Edwards, Cutter-Mackenzie, Moore & Boyd, 2014, p. 25). The emergence of environmental education in early childhood education was influenced by a 2007 UNESCO workshop and the 2009 Bonn Declaration. The resultant publications from these events led to "increased public discussion and awareness regarding the relationship between the education of very young children and the role of sustainability as a core concern of the twenty-first century" (Edwards et al., 2014, p. 27). Caring for the environment is more than simply developing "caring" attitudes in young children. Exhibiting a love of nature or "biophilia" supports having an "ethic of care within our everyday lives" (Wilson, 2008, p. 8). As young children develop interrelationships with people and places (Littledyke & McCrae, 2009) they develop concern for their environment and become more environmentally aware. Yet, despite young Australian children spending limited time in nature (Rao & Aidone, 2019), research has demonstrated that direct interactions with the nature have a positive influence on children's attitudes towards the environment (Beery, 2020; Cutter-Mackenzie-Knowles, Osborn, Lasczik, Malone & Knight, 2021; Dankiw, Tsiros, Baldock & Kumar, 2020).

Davis (2015, p. 18) accounts for the history of environmental education and notes that "an early assumption of environmental education was that adequate knowledge and concern for the environment . . . would create an appropriate environmental ethic" leading to more "environmentally friendly" behavioural change in children. Yet, environmental knowledge and values often did not coalesce, and environmental educators found a range of dimensions within the domain of environmental education that included education about, in, through or from and for the environment (Almeida & O'Hara, 2020). What is apparent in early childhood environmental education is that educators have been found to find it "too hard" or "too depressing" to introduce at an early age (Davis & Davis, 2021, p.114). Yet, Davis et al. (2021) confirm that young children are capable of relating to the ideas that are related to environmental education such as knowledge and values. The experiential opportunities afforded to children by outdoor play in nature are helpful but early childhood environmental education is more than just learning through play (Davis, 2010). Young children's exploratory play in the outdoors is often attributed to learning about the environment yet Edwards et al. (2014) note that more focussed learning is needed to support play in nature.

Nature play and the EYLF

Children often enjoy being in nature and learning about the environment. Playing in nature has been attributed to the learning of young children and "outdoor environments provide different ways of exploring spaces and relationships within those spaces" (Macdonald, 2018, p. 31). Through play young children can explore the natural environment, often discovering and thinking independently about the world around them (Elliott & Chancellor, 2014). The importance of play cannot be undervalued when it is "significant to young children's overall social, emotional, cognitive, and physical development" (Sumpter & Hedefalk, 2015, p.1). This is further acknowledged in the EYLF (DET, 2019, p. 21) as it states that "When children play . . . they create relationships and friendships, test out ideas, challenge each other's thinking and build new understandings." Play provides both a context (a place or space where children play) and a process (a way of learning and teaching) where children can ask questions, solve problems and engage in critical thinking. The EYLF (DET, 2019) is valuable for analysis as it allows for consideration of the importance of the educator's role when nature play occurs. It guides the understanding of the importance of play to young children's learning, where play acts as an enabler for connecting past experiences to new learning and enhances curiosity and creativity. A recent further update to the

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EYLF (AGDE, 2022, p. 17) is valuable in developing understandings of the value of nature play. The most recent version of the framework provides guidance for educators in determining understandings of environmental sustainability as it "focuses on caring for our natural world and protecting, preserving and improving the environment." The EYLF is beneficial for guiding educators to consider nature and the outdoors as spaces of learning about the environment, a place where nature play can occur.

Nature play is a form of children's play. Often unstructured, nature itself provides the environment that leads to the development of a range of skills and knowledge (Dankiw et al., 2020; Warden, 2010). As an example of its benefits in early childhood, nature play provides young children with opportunities to develop understandings of STEM (Cutter-Mackenzie-Knowles et al., 2021). Understandings of mathematics, mathematical reasoning and mathematical processes can be developed without educator guidance or through organised activity with playing in the environment (Macdonald, 2018; Sumpter & Hedefalk, 2015). Technology and engineering skills and concepts have also been found develop in young children through time spent in nature-based education contexts. Young children have been observed to apply the resources that nature provides, sticks, rocks, and leaves to construct shelters and use these "loose parts" (Nicholson, 1972) as technological tools (Speldewinde & Campbell, 2023). The incorporation of movement activities provides young children with opportunities to relate to "specific experiences on the relationship of quantity, number recognition, counting, space and geometry, patterns, and simple operations" (Park, 2020, p. 67). These are the opportunities that prevail for young children through attending bush kinders to develop greater understandings of the environment.

Nature play challenges children's concentration, as often outside spaces are not ergonomically "safe" environments (Campbell & Cutter-Mackenzie, 2015). Children require more focussed attention to move about freely and safely. Children can interact with the vast array of living and non-living natural materials that provide sensory experiences as children can touch and smell the earth after a rain shower or observe water pooling in indentations in the landscape (Campbell et al., 2015). Children can observe ant activity as it increases before it rains or snails moving about after rain. Natural surfaces may become more slippery and require greater care and concentration to navigate. Nature play facilitates children's observational skills as they watch those small animals whose habitat forms part of that environment (Cutter-Mackenzie-Knowles et al., 2021). Handling snails, worms or slaters can fascinate children and provide them with a biophilic approach to living things (Speldewinde, Kilderry, & Campbell, 2021a). They can gain some understanding about habitats when observing these small animals and with educator scaffolding and guidance, children can notice physical characteristics and connect these animals' living requirements. A range of opportunities exist for bush kinder educators to guide children's explorations and discoveries to develop greater level of understanding, care and empathy for the environment (Christiansen et al., 2018).

Bush kinders and the educator's role in fostering environmental understandings

Research into bush kinder practices is in an emergent phase due to bush kinders being a recent addition to early childhood education and care programming (Christiansen et al., 2018; Elliott & Chancellor, 2014; Speldewinde et al., 2023). It has become apparent that the educator's role in fostering environmental understandings in bush kinders relates to the provision of experiences within the bush setting (Campbell & Speldewinde, 2022). Our definition of environmental education encompasses information from multiple sources, such as research, government bodies and teachers. It incorporates five key points (EPA America, 2022) beginning with education that 1. Fosters an environmental knowledge and understanding; 2. Develops awareness and sensitivity of the environment and challenges to the environment; 3. Builds attitudes of concern and motivation to improve environmental quality; 4. Develops skills to recognise and resolve environmental challenges and; 5. Encourages participation in activities that resolve those challenges. We will draw on these five components of the definition of environmental education to demonstrate how,

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through activities, educators and children are provided opportunities in bush kinders to develop ideas and beliefs about the environment, and their relationships with nature is fostered. Environmental education is progressively being interconnected with early childhood curricula as children spend more time in the outdoors interacting with nature (Grogan & Hughes, 2020). In the first instance, this may be enhancing children's opportunities to explore their environment through play, however, there are multiple occasions for educators to foster greater understandings through appropriate support. As children gain an understanding of their natural environment, so too are they empowered by that knowledge and their understanding of it (Campbell et al., 2015). But most importantly, it provides them with a sense of wonder about their natural world and a sense of joy by being in it.

The bush kinder setting can be seen as a medium of learning (education *in* the environment). The local bush kinder environment can be used as a starting point to teach a range of ideas both socially and conceptually, in language, arts, mathematics, social studies, science and STEM areas (Cutter-Mackenzie-Knowles, 2022). Learning needs to occur simultaneously with contact with nature – providing contextual inspiration for learning about the environment and developing a relationship of respect for the environment. Through an emphasis of hands-on experiences with a real-world focus, children's understandings can be enhanced (Speldewinde, 2022). In early childhood bush kinder settings, one of the main purposes of education is to provide circumstances which allow children to increase their knowledge of their natural environment and develop an awareness of their roles in relation to the environment. The early childhood educator facilitates opportunities for children to participate actively in the natural environment (Cutter-Mackenzie-Knowles et al., 2022).

When children learn in bush kinders, they are exposed to many key principles and concepts. For example, they may start to understand the importance of the sun, air, soil and water (Campbell & Speldewinde, 2019). Inoue, Elliott, Mitsuhashi, and Kido (2019) highlight that young children will experience the cycles of life through observing living things and will consider different species' diversity and habitats and possibly how these interact with each other. They will notice change over time, as the seasons evolve, and the environment responds to the changing conditions. An active early childhood educator is crucial for developing the understanding and appreciation of these natural phenomena through their interactions with the children (Campbell & Speldewinde, 2022). Elliot & Chancellor (2014) also indicates that an early childhood educator can build children's understandings about the environment, through play in the natural environment and teacher-instigated explorations. It is important to build young children's confidence in the environment through their knowledge and understanding of the environment and about their rights and responsibilities to act on behalf of the environment. The environmental understandings and the understanding of how living things are interrelated provide children with the background to make judgements within the environment, about the environment. The repurposing of materials allows for children's imagination to be applied to open ended applications of objects and resources in the environment (Speldewinde & Campbell, 2023). Tree sap can be used to glue together wood or become "fairy drops" during imaginary play. A large log can become a rocket or a train whilst being balanced on. Seed pods, leaves, small branches or twigs, shells, sand, gravel/soil, clay and small rocks are all resources in the environment provides which become part of nature play and are use creatively. Their use is limited only by the child's imagination which is valuable to young children as "without opportunities for imaginative play, children may find it difficult to imagine and use abstract concepts for learning later in school" (Fleer, 2021, p. 353). What items are available in nature and their application during creative play is determined by the children as play participants rather than any predetermined contexts (Speldewinde & Campbell, 2023).

Nature kindergartens and "bush kinders"

The popularisation of the natural environment as a place of environmental education for young children's supports the proposition that children's long-term health, well-being, and

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developmental outcomes all benefit from interactions with nature and the outdoors (Elliott & Chancellor, 2014; Knight, 2016). When, in the early 2010s, bush kinders became part of the Australian early childhood learning context they allowed children to gain access to the environment and build an understanding of the Australian environment (Christiansen et al., 2018). The different forms bush kinders can take, such as urban nature reserves, paddocks, or beaches, make them appropriate sites to facilitate environmental education for young children. Bush kinders can occur nearby to the "regular" kindergarten setting in both urban and in rural locations (Campbell & Speldewinde, 2019). Although influenced by Scandinavian and UK forest preschools or nature kindergartens, bush kinders have been adapted to suit Australian conditions. They deliver programmes that provide opportunities for children to move away from learning within a conventional kindergarten setting (Elliott & Chancellor, 2014) yet bush kinder learning can be taken back to the conventional kindergarten and elaborated on. Each bush kinder site has its own characteristics, and the bush kinder programmes vary between sites. These programmes can be influenced by pedagogical approaches adopted by each educator and what the young children find is available for nature play (Speldewinde, Kilderry & Campbell, 2023).

Between the ages of four and five Australian children generally attend preschool. Preschools often have physical characteristics of a weatherboard or "bricks and mortar" building. An outdoor play area that includes artificial equipment and gardens is often also part of the premises. 15 hours of weekly preschool for four-year-olds is mandated and funded by governments as a precursor to commencing schooling (Elliott & Chancellor, 2014; DET Victoria, 2023). Bush kinder sites enable nature play and learning opportunities within the same nature setting often weekly, all-year round, and in almost all types of weather.

Method

Ethnography

The bush kinder can present a challenge for researchers in capturing numerous, simultaneous events yet ethnography has been demonstrated to be an appropriate research methodology for outdoor settings where children learn through their nature play (Speldewinde, 2022). As teaching and learning events occur over a wide-open natural space, researchers involve themselves in a non-intrusive manner while being positioned amid children's play (Delamont, 1992; Madden, 2017). Ethnography, with its emphasis on researcher participation and involvement over an extended time was applied in this research.

This paper, an investigation of young children's understandings of the environment through bush kinder, reports on a research project that applied ethnography. Settings where environmental education takes place are suited to ethnography (Stan & Humberstone, 2011). Young children's social contexts change quickly over the duration of a four-hour, weekly bush kinder session. Ethnography incorporates a range of data gathering methods which in an open, wide space can be beneficial to understanding the events that take place between educator and child (Speldewinde, Kilderry, & Campbell, 2021b). This project is a longitudinal study, and its application of ethnography involved close interactions over a prolonged period so trust building between researcher, educators and children allowed friendly researcher-informant relationships to form. We conducted regular visits (weekly across 3–6 months) in 2015 and 2017 to bush kinders and returned to the bush kinders in 2020 to talk to the early childhood professionals about what had changed over time. We found this valuable to ensure our data remained current and allowed us to observe and discuss the shifting social contexts that were occurring (Last, 2019).

Ethnography, as a research methodology, applies "a particular set of methods (a toolkit)" (Madden, 2017, p. 25). This toolkit was opportunistic and allowed us to apply differing research methods depending on what was occurring in front of us. At times we became participant observers of educators and children, oftentimes active in the children's play, at other time standing

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back from the activity (Speldewinde, 2022a). As part of the regular visits to the bush kinder during data collection, we would remain on site for up to four hours per visit. Ethnography supported us in building broad understanding of events, rather than a singular understanding of the site and its educators. At times our opinion was sought on what was happening in nature yet at other times, we actively listened to the discussions occurring place between children and educators (Speldewinde, 2022a). The semi-structured interviews, informal discussions, and photographic and video images of play and teaching moments allowed us to develop a deep understanding of how the educators and children experience the environment. These were supported by journal notes taken both whilst at the bush kinders and upon return to our offices that prompted us to be reflexive and consider the observations of how the children were building their knowledge of the natural environment of the bush kinder. Voice recorders and iPads were used by both researchers at different sites to record the data. This wide range of data allowed us to interrogate the relations that were continually shifting between children, early childhood professionals and how play developed insights of the environment.

Participants and settings

The Sandy Shores Shire (pseudonym) of south-eastern Australia is a location where, in 2022, a number (six) of bush kinders occur. Four bush kinders located at Chatlock, Sunrise, Wicklesham and Whitesands participated in this research during 2015, 2017 and 2020, each with dissimilar characteristics in terms of the landscape. Similarities were evident with matters associated with health and safety that were overseen by the local government authority who completed risk assessments of the appropriateness of a bush kinder site in conjunction with the bush kinder educators. Two of the four bush kinder sites were set away from the regular kindergarten, the other two were adjacent to the regular kindergarten. All sites were located within twenty kilometres to each other and our university. Deakin University Human Research Ethics approval (Approval number HAE-15-016) was gained and state government research protocols adopted. Research participation was voluntary and signed consents by the kindergarten organisation, its educators and its parents were obtained. We made the parents and guardians aware of the study through the educators, who distributed consent documents on our behalf. We also were available prior to commencing the research and whilst on site at the bush kinders for parents to discuss any concerns or ask questions about our research. Anonymity as a condition of participation (pseudonyms have been used throughout this paper), secure and timely data storage, and rights to withdraw from the study were offered as part of the research consent process.

Upon approval from the appropriate authorities to conduct the study, we met with the educators to establish the research processes. Each bush kinder had a lead teacher and two educators along with 20–25 four-year-old children in each bush kinder class. These early childhood education professionals were all experienced, degree qualified, and had many years of preschool teaching experience. They were all quite new to bush kinder teaching when we commenced the research in 2015 as all bush kinders had commenced operation in 2014 and the educators had no prior bush kinder teaching experience. Over the duration of this study, we undertook approximately one hundred visits to the four bush kinders that focussed on the teachers and several hundred children. The children's involvement in the study was limited to observation of play and interactions with the educators. This research approach was adopted to ensure that the children's play and learning were not interrupted by our presence (Speldewinde, Kilderry, & Campbell, 2021a). In 2015, we visited the bush kinders four to six times per ten-week term for three terms. We applied a similar visitation schedule for two terms in 2017 and spent three to four hours on site during each visit. In 2020, additional visits took place to extend the data so we could understand what further developments had occurred in the bush kinders. The COVID pandemic curtailed further planned visits. As a natural environment in the outdoors, we were

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cognisant to attend the bush kinder at different times of the year so we could observe the seasonal differences occurring in bush kinder. The bush kinder sessions would always take place unless the weather circumstances were particularly inclement such as thunderstorms or excessive heat. Light rain or windy days would not be sufficient reason to stop a session from taking place.

This study is limited by its small number of field sites however we mitigate this by the bush kinder approach being in an emergent phase and the longitudinal nature of the research. Despite this limitation, the wide range of experiences due to the seasonal changes in the bush kinder environment that led to children's differing interests being piqued, allows us to generate a rich volume of data to analyse. Hundreds of examples of children building a relationship with the environment became apparent as we continued to regularly visit the bush kinder sites. We have selected several examples and then categorised these according to the five components that inform our definition of environmental education (EPA America, 2022). The following vignettes highlight the data relating to environmental education in early childhood nature-based education.

Findings: Bush kinders developing children's understanding of the environment

This paper presents one main finding, that nature-based early childhood education contexts such as bush kinder play an important role in developing children's understanding of the environment. The following four vignettes, caring for a worm, (re)planting three-leafed clovers, spotting different clouds and what animal is that, are described in detail. Through these vignettes, we describe four events, each that capture how the early childhood professionals and the children were interacting with the environment. Bush kinders in Australia generally commence in February when summer is ending and continue through changing seasons until early December.

A: Caring for a worm

The first vignette occurred on an Autumn morning. It involved two girls sitting on a mat. Bush kinders are alive with small animals such as worms, beetles, butterflies and birds. Caring for these small animals provides educators opportunities to consider the environment.

> *Two girls were sitting on a plastic mat on the grass when they noticed that a worm was making its way towards the edge of the plastic. They obligingly moved back to allow the worm entry to the mat and continued to observe it. "Oooo, look at it, it is really wriggly" exclaimed one girl. The worm seemed to be having some difficulty moving as it would if it was on grass or bare earth as it made its way onto the plastic mat. The girls observed the difficulty being experienced by the worm. They were concerned. "Can we pick it up?" asked one of them, as they wanted to shift it off the mat and back onto the grass. They had been told by the educator never to pick up any of the small animals in the bush kinder setting without asking. The teacher responded that they could, but stated that they had to be very gentle. When they picked it up, one of them held it in their hand for a few seconds then gently passed it to the other and felt the way it moved. They stared at it intently while also considering how it felt on their bare skin. The educator prompted the girls and asked what they were feeling and what they could see. Both commented to the educator on how cold it felt and how slippery it was as it wriggled. With care, they returned it to the soil a few meters away from the mat. They continued to watch the worm to see where it would go. As they watched, the educator and children talked about the importance of caring for all animals regardless of their size. The worm began to bury itself into the soft earth. The girls continued to watch, intrigued by the movement of the worm. Eventually they could no longer see it so decided that it must have gone back underground to its home.*

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B: Re-planting three-leafed clovers

A few weeks later, the bush kinder group had been helping to plant seedlings during a session at the kindergarten. This prompted children during their play to want to find other plants to grow in the bush kinder and the search for plants to propagate. The children were able to consider what they viewed as good ground cover and the educators were able to reinforce learning from the regular kindergarten session.

Having planted small vegetable seedlings into tubs at the regular kindergarten, some children had become interested in what they could plant at bush kinder. The children decided that the bare earth was not good and that the environment would be better if grass and bushes and trees covered the ground. A few of the children were interested in planting their own "garden" in the bush setting, so, using small sticks to dig into the bare earth, proceeded to scratch at the ground until they had made a small patch, approximately 30 × 20 centimetres. The gentle digging continued using the sticks as the children were not sure what lay beneath the surface. The children softened the earth and eventually approximately one centimetre of the ground and been loosen and tuned over, ready for planting. The children weren't quite sure what they could plant there as they had no seeds. They approached the educator who challenged the children to think what else they could do. After further discussion, the children found some small clover plants to transplant from another part of the bush kinder grassed area. With the clover plants in the ground, the children then carefully watered the plants using their water bottles. During each weekly session, the children observed their plants for many weeks, tending to them by giving them water if necessary. They also took their learning back to the kinder setting, drawing pictures of their plants as they grew over a number of weeks.

C: Spotting different clouds

As the year progressed, and winter took hold, what had been a dry Autumn was replaced by a cold, wet winter. The days changed from sunny, cool and dry to dark, wet and windy. Often there would be rain during the bush kinder but this did not stop the session. Only in the most inclement of weather would the session have to be relocated indoors. The opportunity was presented for the educators to spend time teaching the children about what was happening in the environment as the season had changed. The following vignette provides an account of a discussion on weather, in particular clouds.

At the early childhood setting, the teacher had been focussing for several weeks on weather. The children sang songs about the weather, looked at books, had drawn pictures. It was wintertime so it was often rainy and windy, occasional days were partially sunny but the air temperature remained cold. One day, while talking with children about the weather, the topic of clouds was raised by one of the children. The boy said "rain comes from black clouds." This immediately led to robust discussion as other children interjected with their own ideas, agreeing that dark clouds usually herald rain, but also that clouds could also be white and fluffy. A few days later, the children ventured for their day at bush kinder. The children gathered at the start of the session in a group and the teacher asked the children to look up, observe the clouds and talk about what they think they would see. The educator pointed to different clouds, asking what they could see and what differences were observable. Colours, shapes, how the clouds were moving. Conversations took place and many were amazed at the different shapes – not just fluffy. As is often the way clouds are depicted in children's books, the teacher prompted the children to think about why some were long and wispy. One child raised the idea that perhaps wind was blowing them and spreading them out. Another pointed to the cloud and said it is black because it is full of water and ice. The educator confirmed the idea of wind involvement when they noticed that some of the clouds seemed to be moving across the sky. Shortly after it began to rain and the children continued their play and observations of the clouds as they moved overhead.

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D: What animal is that?

The cold winter passed and spring had arrived. With the spring came trees growing new leaves, nesting birds and small animals moving about. Opportunities abounded as beetles, and ants came out of the earth. These small animals provide children with opportunities to understand animal behaviour.

> *Young children were sitting on the grass on a warm sunny spring morning. One child noticed an ant crawling over her leg, she jumped up, somewhat concerned and brushed it off, worried that the ant would bite her leg but still careful not to injure the ant. The teacher talked to her, explaining that there were many different small animals on the ground and around her in nature. Together with her friend, she proceeded to start to look for these small animals. In the grass where she had been sitting, the girls also found other ants and some slaters. She recognised the slaters but didn't know what to call them. She moved to another site under the trees and found many other animals: millipedes, larger ants, small spiders and worms. The girls knew the names of some of the animals, others they were unsure of. The girls watched the behaviours of some of the small animals and became deeply engrossed with the ants, following them as they moved in a line for several metres. The girl, bored with the ants, found a slater. When touched a slater will curl into a ball as a defence mechanism. Intrigued how the slater rolled up into a ball when it was knocked by a twig she had moved, the girl sat and watched the slater uncurl itself from its ball then move on. The educator commented to us at the end of the session that she felt the girl had learned much about small animals and how they behave and that she was learning about animal behaviour as a way of understanding how the animals are a part of the environment, contributing to her understanding of the world of nature.*

Analysis

The vignettes provide opportunities for analysis of how play in nature-based settings support children to develop understandings of the environment and what was occurring around them in nature. As the learning is play-based, developing understandings of the environment in line with EPA America's (2022) five components of environmental education is almost exclusively generated by the children with the support of the early childhood professional. Each example demonstrates that the children's play guided by teacher talk facilitated an appreciation, a deeper understanding of the natural world and the elements that constitute the components that EPA America (2022) view as constituting environmental education. These five components are listed in Table 1 and data from the vignettes applied to the components. Emphasis in the following analysis, captured in Table 1, focusses on how the four vignettes demonstrate examples of children's play leading to teacher scaffolding of environmental education as part of the children's play. Well-scaffolded early childhood environmental education can provide "young children with some freedom to choose how long they spend at various activities, the children's agency in their own learning is acknowledged" (Dawson & Beattie, 2018, p. 132). The contextualisation of child-led bush kinder environmental education teaching and learning facilitated our development of a table using the research data collected. The analysis provided in Table 1 demonstrates that incorporating environmental education into teaching programmes has benefits for young children learning about the natural world around them. The learning events captured in the four vignettes are a small sample of the many examples of learning about the environment observed during this research. Often unplanned, children's nature play during their bush kinder sessions was generally spontaneous.

Discussion: Bush Kinder Benefits, Building an Affinity with Nature

During the children's nature play in bush kinder sessions, we observed children exhibiting characteristics of the five components that can at times and variously constitute environmental

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Table 1. Data analysis

Environmental Education Component (Adapted from EPA America, 2022)	Exhibited by	Vignette description
Awareness and sensitivity to the environment and environmental challenges	Understanding how small animals can adapt and defend. Being aware of the ground and ground cover.	*The teacher responded that they could, but stated that they had to be very gentle.* (Vignette A) *The gentle digging continued using the sticks as the children were not sure what lay beneath the surface.* (Vignette B) *With the clover plants in the ground, the children then carefully watered the plants using their water bottles.* (Vignette B) *(She) brushed it off, worried that the ant would bite her leg but still careful not to injure the ant.* (Vignette D)
Knowledge and understanding of the environment and environmental challenges	Commenting on clouds and weather Understanding animal behaviour	*The educator prompted the girls and asked what they were feeling and what they could see. Both commented to the educator on how cold it felt and how slippery it was as it wriggled.* (Vignette A) *The boy said "rain comes from black clouds."* (Vignette C) *The teacher talked to her, explaining that there were many different small animals on the ground and around her in nature.* (Vignette D)
Attitudes of concern for the environment and motivation to improve or maintain environmental quality	Caring for the worm Ground degradation replacing the bare earth with clover	*The girls observed the difficulty being experienced by the worm. They were concerned.* (Vignette A) *The children decided that the bare earth was not good and that the environment would be better if grass and bushes and trees covered the ground.* (Vignette B)
Skills to identify and help resolve environmental challenges	Ground degradation replacing the bare earth with clover Deepening understanding of weather	*During each weekly session, the children observed their plants for many weeks, tending to them by giving them water if necessary.* (Vignette B) *The educator asked the children to explain what characteristics of clouds they were observing.* (Vignette C) *Another pointed to the cloud and said it is black because it is full of water and ice.* (Vignette C)
Participation in activities that lead to the resolution of environmental challenges	Protecting and caring for the worm	*As they watched, the educator and children talked about the importance of caring for all animals regardless of their size. (Vignette A)* *The children decided that the bare earth was not good and that the environment would be better if grass and plants covered the ground.* (Vignette B)

education (EPA America, 2022). Table 1 shows that each of the four vignettes exhibits characteristics of multiple components of the definition of environmental education. For example, in most of the vignettes, the children displayed the first of the five components, awareness and sensitivity to the environment. The children often took care when handling plants and animals such as the handling of the ants and the small plants in Vignettes B and D. They showed care when watering the plants and consciousness for the welfare of everything that inhabited the bush kinder environment. Time spent in bush kinder supported the children to develop understandings and

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knowledge of what constituted the environment. In line with the second component, knowledge and understanding of the environment and environmental challenges, educators would often ask questions regarding what the children were observing (Vignette A) and focussed their questioning to elicit responses that engaged the children in articulating their knowledge of what they were learning by experiencing the environment of the bush kinder (Vignette D). Questions like "How does it feel?" or "What can you see?" (Vignette A) challenged the children to engage with the experience of the environment and build their knowledge.

The third component of developing attitudes of concern for the environment were apparent in the way the children displayed concern for the worm as it tried to move back into the earth (Vignette A). The children also appeared to understand the issues with land being cleared when they decided that "the bare earth was not good" and when trees and grass benefitted the environment (Vignette B). The fourth and fifth components which relate to the resolution of environmental challenges may be in themselves challenging for young children. However, in most vignettes, the children were observed to be developing the skill of observation that can be built on in later years of schooling.

The novel aspects outlined in this paper are its application of the EPA America definition of environmental education to a bush kinder context, and the resultant validation of children's improved understandings of the environment through direct ethnographic research within Australia. The paper shows through the examples how EC professionals can focus the learning to support the play (Edwards et al., 2014). The paper confirms that when educators take the time to focus on the environmental learning and understand that environmental education is more than just learning through play (Davis, 2010), they can extend the children's play and scaffold to support the children's learning. As indicated earlier, the language of environmental education is understood differently by individuals, organisations and various groups (Inoue et al., 2019). Using a specific definition, the five components from EPA America provide opportunities to link in with specific behaviours and understandings and are beneficial in analysing the data provided in the vignettes. The analysis highlights the opportunities early childhood professionals have to develop children's environmental awareness. This awareness can be taken back to the kindergarten classroom, then be recorded through children's drawing and comments and in reports to make it evident to the learning community. What we came to understand and relate back to a body of literature including seminal work such as Louv's (2008) was that during our time spent in bush kinders, children's nature play facilitates the development of environmental understandings. This paper confirms the criticality of educator scaffolding and the crucial role educators play in supporting children's developing knowledge of the environment. Handling small animals and plants and observing clouds are examples of how children explore and encounter the environment through play.

Conclusion

The importance placed on the role of the educator in supporting children's developing understandings of the environment cannot be understated. The many teachable moments that occur in a four-hour bush kinder session that allow for scaffolding at the point of need, enable children's environmental awareness to develop. When considering environmental education in the early years, the data provided in the small selection of samples here and the subsequent analysis presented in this paper provides insights into the learning opportunities afforded by nature-based teaching and learning contexts such as bush kinders. From the natural materials, both loose and fixed, to small animals, to what children can observe in the sky and their surroundings, educators become enablers of children's developing understandings of the environment. An educator's scaffolding through their interactions and dialogue, and through alerting children to what is in the environment provides children with diverse learning experiences

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and can draw children's attention to appreciating and caring for the environment. The discussions that occurred between children and educators led to the development of skills and knowledge of environmental challenges and added to the depth of the learning occurring in the bush kinder.

The implications of this research point to the opportunities available for young children's environmental education in Australian bush kinders. Children have been shown here to become more engaged while teachers also become skilled practitioners in environmental education through time spent in bush kinders. More broadly contexts such as European and UK forest schools as well as Canada, China and elsewhere, where the number of nature-based early childhood education sites continue to grow, this research demonstrates the potential of place-based education while also confirming to educators the importance of their involvement with young children's engagement in their local environment. Place-based education relates to the immersion of children in local sites, cultures and experiences which then become the foundation for learning of many topics, including the environment. Additionally, there are further opportunities for universities and teacher educators to be actively supporting educators in developing the skill of scaffolding at point of need in bush kinders (and other learning environments), and to develop competencies in responding to an emergent curriculum that can be evident in bush kinders.

With help, children can build an appreciation of the environment and the current environmental challenges which can be carried into later schooling. Bush kinders and the teaching that occurs enhance and sustain children's new and developing understanding of the environment. Each of EPA America's (2022) five components provide opportunities for further thought on how these ideas can be included in bush kinder programmes and how these ideas are transmissible into indoor classrooms to build confident environmentalists for the future.

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