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Addressing Issues, Policies, Practices, and Research That Matter

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A HISTORICAL NOTE FROM THE EDITORS

Rachel Carson: Celebrated Environmental Ecologist and Early Childhood Environmental Education Advocate

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Not quite 60 years ago, and several years before the publication of *Silent Spring* (1962), Rachel Carson shared her thoughts about nurturing children's connection with nature in the *Woman's Home Companion* (July, 1956). Typically very private - and even protective - of her family experiences and history (Lear, 1997), Carson wrote the article presumably because of the very transcendent and powerful meaning, need, and value to engage children early on in the transformative experiences afforded only by the rhythms of biology and nature. She had described her experiences with her very young great nephew, of whom she later adopted following the passing of his mother.

Titled *Help Your Child to Wonder* in the Woman's Home Companion, and posthumously published as *The Sense of Wonder* by Harper & Row Publishers in 1965, Carson, in her usual lyrical and marvelous prose, wrote about her "adventures" with her great nephew, Roger, starting at the age of 20 months and up past his fourth birthday.

We thought we would share with you some compelling quotations about her perceptions along with our own interpretations. Concurrently, we invite you to reflect on the quotations and draw your own conclusions prior to reading our interpretations. Better yet, it may be better to first read *The Sense of Wonder* in its entirety to determine for yourself the appropriateness of her reasonings.

Quotation

A child's world is fresh and new and beautiful,
full of wonder and excitement.

Our interpretation:

Children are exceptionally receptive to new learning experiences, driven by both biological and physical processes to absorb experiences in constructing an ever increasing base of knowledge and skills. Along with safe, nurturing environments and healthy nutrition, experiences are what feed their minds and compel their bodies to react. Delight, exploration, and wonder are children's responses, intrinsically motivating in itself, at having discovered and learned something different or new. The early years are formative years, meaning that the early experiences will have a significant and long-lasting influence on their behaviors, characteristics, and skills in adulthood.

Quotation

It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood.

Our interpretation:

The world of today is full of competing influences, such as television watching and preoccupations with screen-based game playing, which take opportunities and time away from developing a deep, intimate relationship with wonders of the natural world. Parents, too, are more than ever pressed for time. Pressures at work and chores at home provide little opportunity for the parents to help their children explore places of nature. A lack in frequent and enjoyable exposure to the world of nature is likely to lead to a lack of value for natural environments.

Quotation

> *If a child is to keep his inborn sense of wonder... he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in.*

Our interpretation:

All it takes is one caring or committed adult, someone who the child can come to trust and learn from, in helping the child develop an attachment to natural environments. This relationship is more about role modeling the enjoyment and marvel of the natural world. It is also a flexible and interactive relationship, building upon the interests shown by the child as well as language experiences and teaching, that encourages the child to explore, discover, and understand how nature works.

Quotation

> *Caregivers "often have a sense of inadequacy when confronted on the one hand with the eager, sensitive mind of a child and on the other hand with a world of complex physical nature… that it seems hopeless to reduce it to order and knowledge… (and) in a mood of self-defeat… exclaim, 'How can I possibly teach my child about nature - (when) I don't even know one bird from another'".*

Our interpretation:

The relationship should be one of enjoyment and learning together. It is an opportunity for caregivers and teachers to assist children in gathering and discovering information: paying attention to colors, patterns, and natural materials; listening to sounds; exploring shapes, textures, and weights; noticing actions, rhythms, and smells; asking intriguing questions and conversing about possible explanations; and sensing the moods that are created. Children and caregivers can further investigate the experiences utilizing the many resources available. Apps, field guides, nature idea books, nature story books, nature education centers, and websites are some of the many resources available.

Quotation

> *I sincerely believe that for the child, and for the (caregiver) seeking to guide him, it is not half as important as to feel.*

Our interpretation:

Environmental education for young children should focus on helping children develop an emotional connection with nature and the environment around them. Children's curiosities serve as the basis of building interest and motivation in learning about the natural world, and children need the enjoyment that comes from engaging, learning, understanding, and problem-solving. These experiences are best enjoyed in the company of their loved caregivers and teachers.

Quotation

> *If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impression of the senses are fertile soil in which the seeds must grow.*

Our interpretation:

Sensory experiences, and the affirming and encouraging emotions associated with the use of the senses, are fundamental processes in the development of children's dispositions, knowledge, and skills. Repeated experiences, as well as differing experiences, are required for growth to occur. Should the emotions and the sensory experiences be less than satisfactory, there is a chance that children will be turned off and be less willing to engage in future experiences.

Quotation

> *The years of early childhood are the time to (arouse)… a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, admiration.*

Our interpretation:

The importance of the early formative years cannot be understated. Attachment to nature, along with the sense that nature is an incredible place of learning, is important to cultivate. As caregivers and teachers, we must provide abundant opportunities that allow children to spend time in natural environments. Children are encouraged to ask questions, imagine and think, observe, and use or manipulate naturally found materials. Opportunities for children to creatively express their feelings and understanding of the natural world, too, are a part of the experience in developing greater attachment with the natural world.

Quotation

> *Once (emotional responses have been established), it has lasting meaning. It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate.*

Our interpretation:

In the early years, teaching should be more about helping children develop a sense of enjoyment and deep satisfaction that come from observations, interactions with, and personal discoveries about the world of nature. It is through the processes of enjoyment in which children best construct knowledge and practice skills. The caregivers and teachers are available to guide and respond as needed or when appropriate. Altogether, these experiences aid in the continued want of learning about the world of nature.

Quotation

> *Exploring nature with your child is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils, and finger tips, opening up channels of sensory impression.*

Our interpretation:

From the northwest coasts of Oregon to the southeast coasts of Florida, and all around the world, nature abounds and can reawaken desires for learning, as children would experience when given the encouragement and guidance. Environmental education centers, programs offered by local nature organizations,

and frequent field trips to places of natural beauty, including what is right outside your door and other nearby places such as gardens and parks, can be sources of information and inspiration to get you started.

We believe a positive and warm regard for the world of nature is an essential ingredient that fosters the achievement of the larger goals related to "values and attitudes, skills and behavior consistent with sustainable development and effective… public participation in decision-making" (United Nations Environment Programme, 1992). This regard is required of both adults and children, as implied in the verses provided by Rachel Carson - and should be a focal point of curriculum and creative strategies in child development centers, community initiatives, and environmental education efforts.

We call on all those in close contact with children to create "experiences that sustain" as well as "sustained experiences" that build increasing capacities in children's positive and warm regard for nature. In *Re-Connecting the World's Children to Nature* (World Forum-Nature Action Collaborative for Children, Nebraska Nature Action Collaborative for Children, & National Association of Early Childhood Specialists in State Departments of Education, 2008), concrete ideas are provided for "making developmentally appropriate nature education a sustaining and enriching, fully integrated part of the daily lives and education of the world's children" (p. 1). The document can be accessed at http://www.worldforumfoundation.org/wf/nacc/call_to_action.pdf at no cost. In it, implications for both curriculum and leadership at multiple levels are articulated. Daily unstructured and semi-structured experiences in largely natural environments, creation of easier and greater access to places of nature, innovative curriculum developed through collaborative partnerships, and adoption of policies that provide support for nature-integrated curriculum are a few of the ideas provided in the document.

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UNA NOTA HISTORICA DE LOS EDITORES

Rachel Carson: La Renombrada Activista Ecológica Medioambiental y Defensora de la Educación Infantil

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(Spanish language translation provided by **John Hardman**, Florida Atlantic University)

(Traducción al español hecha por **John Hardman**, Florida Atlantic University)

Hace poco menos de 60 años, y antes de la publicación de *Silent Spring* (1962), Rachel Carson compartió sus pensamientos acerca de la cultivación de la conexión de los niños con la naturaleza en *Woman's Home Companion* (Juio, 1956). Típicamente una persona muy privada – y aún protectora – de las experiencias e historia familiares (Lear, 1997), Carson escribió el artículo presumiblemente debido al significado, la necesidad, y el valor trascendentes de involucrar a los niños a temprana edad en las experiencias transformadoras ofrecidas exclusivamente por los ritmos de la biología y la naturaleza. Había descrito sus experiencias con su joven sobrino nieto, a quien adoptó luego del fallecimiento de su madre.

Titulado *Help Your Child to Wonder* (Ayuda a tu Niño a Maravillarse) en *Home Companion*, y póstumante publicado por Harper & Row Publishers en 1965 como *The Sense of Wonder* (El Sentido de la Maravilla), Carson, con su prosa habitualmente lírica y maravillosa, escribió acerca de sus "aventuras" con su sobrino nieto, Roger, comenzando a la edad de 20 meses y continuando hasta después de su cuarto cumpleaños.

Hemos pensado en compartir algunas citas movilizadoras acerca de sus percepciones, acompañadas de nuestras interpretaciones. A la vez, los invitamos a reflexionar sobre las citas y sacar sus propias conclusiones antes de leer nuestras interpretaciones. Aún mejor, puede resultar mejor leer antes e íntegramente *El Sentido de la Maravilla* para decidir por ustedes mismos cuan acertados eran sus razonamientos.

Cita

> *El mundo de un niño es fresco y nuevo y hermoso, lleno de maravilla y emoción.*

Nuestra interpretación:

Los niños son excepcionalmente receptivos a nuevas experiencias de aprendizaje, motivados por procesos biológicos y físicos a absorber experiencias en la construcción de un bagaje cada vez mayor de conocimientos y destrezas. A la par de ambientes seguros y una dieta saludable, las experiencias alimentan sus mentes e impulsan a sus cuerpos a reaccionar. El deleite, la exploración, y la maravilla son las respuestas del niño, intrínsecamente motivadoras en sí mismos, al descubrir y aprender algo diferente o nuevo. Los primeros años son años formativos, y esto implica que las primeras experiencias tendrán una influencia significativa y duradera en sus conductas, características, y destrezas en la adultez.

Cita

> *Es nuestra mala fortuna que para la mayoría de nosotros, esa mirada clara, ese instinto verdadero para todo aquello que es bello y maravilloso, se vaya apagando e incluso se pierda antes de la adultez.*

Nuestra interpretación:

El mundo actual está repleto de influencias que compiten entre sí, tales como la televisión y los juegos electrónicos. Estos nos quitan oportunidades y tiempo para desarrollar una relación profunda e íntima con las maravillas del mundo natural. Más que nunca, los padres también se encuentran faltos de tiempo. Las presiones laborales y las tareas domésticas ofrecen escasa oportunidad para que los padres ayuden a sus hijos a explorar ambientes naturales. La falta del contacto frecuente y placentero con el mundo natural puede llevar a la desvalorización de los entornos naturales.

Cita

> *Si un niño ha de conservar su capacidad para maravillarse...necesita la compañía de al menos un adulto que puede compartir con él, redescubriendo con él la alegría, la emoción y el misterio del mundo en que vivimos.*

Nuestra interpretación:

Solo se necesita un adulto cariñoso y comprometido, alguien en quien el niño pueda confiar y de quien pueda aprender, alguien que pueda ayudar al niño a crear un vínculo con los entornos naturales. Esta relación tiene más que ver con modelar el placer y la maravilla por el mundo natural. Esta es también una relación flexible e interactiva, que va construyendo sobre los intereses demostrados por el niño además de las experiencias lingüísticas y la enseñanza, que estimula al niño a explorar, descubrir, y comprender como funciona la naturaleza.

Cita

> *Los padres "a menudo se sienten inadecuados al enfrentarse por un lado con la mente inquieta y sensible de un niño, y por el otro con el mundo de una naturaleza física compleja… que parece irreductible al orden y al conocimiento… (y) en un arranque de auto-derrota… declaran, '¿Cómo puedo enseñar a mi niño sobre la naturaleza – cuando ni siquiera puedo distinguir entre un ave y otra?'"*

Nuestra interpretación:

La relación debe posibilitar disfrutar y aprender juntos. Esta es una oportunidad para que los padres y docentes ayuden a los niños en recopilar y descubrir información prestando atención a los colores, patrones, y materiales naturales; escuchando sonidos; explorando formas, texturas, y pesos; notando acciones, ritmos, y olores; formulando preguntas intrigantes y conversando sobre posibles explicaciones; y sintiendo los climas emocionales que se van creando. Los niños y los padres pueden investigar las experiencias utilizando un gran número de recursos disponibles. Los 'apps,' las guías de campo, los libros de ideas y de cuentos sobre la naturaleza, los centros de educación sobre la naturaleza, y las páginas Web son algunos de los muchos recursos disponibles.

Cita

> *Sinceramente creo que para el niño, y para el padre que desea guiarlo, nada es tan importante como el sentir.*

Nuestra interpretación:

La educación medio-ambiental para los niños pequeños debe focalizarse en ayudarles a desarrollar una conexión emocional con la naturaleza y el entorno que los rodea. Las curiosidades de los niños sirven de base para desarrollar el interés y la motivación por aprender acerca del mundo natural, y los niños necesitan del placer que viene de entregarse, aprender, comprender, y resolver problemas. Estas experiencias se disfrutan más plenamente en compañía de sus amados padres y maestros.

Cita

> *Si los hechos son las semillas que luego producen el conocimiento y la sabiduría, entonces las emociones y las impresiones de los sentidos son el suelo fértil donde las semillas deben crecer.*

Nuestra interpretación:

Las experiencias sensoriales, y las emociones alentadoras y afirmativas asociadas con el uso de los sentidos, son procesos fundamentales en el desarrollo de las actitudes, el conocimiento, y las destrezas de los niños. Las experiencias reiteradas, así como la diversidad de las mismas, son necesarias para el desarrollo. Si las emociones y las experiencias sensoriales son poco satisfactorias, es posible que los niños vean disminuida su disposición para entregarse a experiencias futuras.

Cita

> *Los años de la infancia son el momento para despertar….un sentido de la belleza, de la excitación por lo nuevo y desconocido, un sentimiento de simpatía y admiración.*

Nuestra interpretación:

No debe subestimarse la importancia de los primeros años formativos. Es importante cultivar el vínculo con la naturaleza, acompañado por el sentido que la naturaleza es un lugar increíble para el aprendizaje. Como padres y docentes, debemos ofrecer múltiples oportunidades que permiten a los niños pasar tiempo en entornos naturales. A los niños se les debe estimular a hacer preguntas, a imaginar y pensar, a observar, y a usar o manipular materiales de la naturaleza. Las oportunidades brindadas a los niños para que expresen sus sentimientos creativamente y para que comprendan al mundo natural también son una parte de la experiencia de desarrollar un vínculo más profundo con el mundo natural.

Cita

> *Una vez (que se han establecidos respuestas emocionales), la conexión con la naturaleza se vuelve duradera y significativa. Importa más preparar el camino para que niño quiera saber que darle una dieta de hechos que no está preparado para asimilar.*

Nuestra interpretación:

En los primeros años, la enseñanza debe ser más acerca de ayudar a los niños para que desarrollen el sentido del placer y la profunda satisfacción que resulta de las observaciones, las interacciones con y los descubrimientos personales sobre el mundo de la naturaleza. Es a través de los procesos de disfrutar donde los niños mejor construyen el conocimiento y las destrezas. Los padres y maestros están disponibles para guiar y responder cuando hace falta o cuando es apropiado. En su conjunto, estas experiencias contribuyen a sostener el deseo de aprender acerca de la naturaleza.

Cita

> *El explorar la naturaleza con su niño es principalmente un asunto de volverse receptivo a lo que se encuentra en su entorno. Es aprender nuevamente a usar los ojos, los oídos, la nariz, las yemas de los dedos, y abrir los canales de la impresión sensorial.*

Nuestra interpretación:

Desde las costas del noroeste de Oregon hasta las costas del sudeste de la Florida, y alrededor del mundo, la naturaleza abunda y puede despertar nuevamente el deseo de aprender, así como lo experimentarían los niños con la estimulación y orientación adecuadas. Los centros de educación medio-ambiental, los programas ofrecidos por organizaciones locales dedicadas a la naturaleza, y los viajes de estudio frecuentes a lugares de belleza natural, además lo que uno tiene en la puerta incluyendo parques y jardines, pueden ser fuentes de información e inspiración.

Creemos que el cariño por el mundo de la naturaleza es un ingrediente esencial que promueve el logro de metas más importantes relacionadas con "valores y actitudes, destrezas y conductas coherentes con el desarrollo sostenible y la efectiva… participación pública en la toma de decisiones" (Programa sobre el Medio Ambiente de las Naciones Unidas, 1992). Este cariño debe hallarse tanto en adultos como los niños – y debe ser un punto focal del currículum y de las estrategias creativas en centros infantiles, en iniciativas comunitarias, y en las iniciativas en la educación medio-ambiental.

Apelamos a todos aquellos que están en frecuente contacto con niños a que crean "experiencias que sostienen" además de "experiencias sostenidas" que desarrollen una capacidad cada vez mayor para el afecto positivo y cariñoso de los niños por la naturaleza. En *Re-Connecting the World's Children to Nature* (World Forum-Nature Action Collaborative for Children, Nebraska Nature Action Collaborative for Children, & National Association of Early Childhood Specialists in State Departments of Education, 2008), se brindan ideas concretas para hacer de la "educación sobre la naturaleza apropiada para la etapa de desarrollo una parte sostenedora, enriquecedora y plenamente integrada en la vida diaria y la educación de los niños del mundo" (p. 1). Este documento puede accederse sin costo en http://www.worldforumfoundation.org/wf/nacc/call_to_action.pdf. En él, se articulan implicancias tanto para el currículum como para el liderazgo en múltiples niveles. Entre las ideas ofrecidas, se describen experiencias no estructuradas o semi-estructuradas en ambientes mayormente naturales, la facilitación del acceso a lugares de naturaleza, el desarrollo de innovaciones en el currículum a través de sociedades de colaboración, y la adopción de políticas que ofrecen apoyo para currículos que integran la naturaleza.

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UMA NOTA HISTÓRICA DOS EDITORES

Rachel Carson: Célebre Ecologista Ambiental e Defensora da Educação Ambiental na Primeira Infância

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(Portuguese language translation provided by **Simone Tuinhof de Moed**,
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(Tradução para a língua portuguesa fornecida por **Simone Tuinhof de Moed**,
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Por volta de 60 anos, e muito antes da publicação de *Silent Spring* (1962), Rachel Carson relatou o que pensava sobre cultivar a conexão das crianças com a natureza na sua publicação *Woman's Home Companion* (July 1956). Tipicamente muito reservada e até protetora das experiências e historia da própria família (Lear 1997), Carson escreveu um artigo supostamente devido ao significado muito transcendente e poderoso, necessário, e de valor para engajar o quanto antes as crianças em experiências transformativas proporcionadas pelo ritmo da biologia e natureza. Ela relatou as próprias experiências com o sobrinho neto, o qual o adotou após a mãe ter falecido.

Titulado *Help Your Child to Wonder* na publicação *Woman's Home Companion,* e postumamente publicado como *The Sense of Wonder* por Harper & Row Publishers (1965), Carson, com sua prosa lírica e maravilhosa, escreveu sobre as "aventuras" com o sobrinho neto, Roger, começando quando ele tinha um ano e seis meses até quatro anos de idade.

Nós pensamos em partilhar algumas citações convincentes sobre as percepções de Carson, visando as nossas interpretações. Ao mesmo tempo convidamos a vocês para refletirem nas citações e tirar suas próprias conclusões antes de ler as nossas interpretações. Ou melhor, sugerimos ler primeiro *The Sense of Wonder* para determinar por vocês mesmos a capacidade de raciocínio de Rachel Carson.

Citação

O mundo da criança é puro e novo e bonito,
cheio de magia e entusiasmo.

A nossa interpretação:

As crianças são excepcionalmente receptivas a aprender novas experiências guiadas pelo processo físico e biológico para absorver experiências em construir uma base que aumenta gradualmente a capacidade e a sabedoria. Juntamente com ambientes seguros e agradaveis, e nutrição saudável, as experiências alimentam a mente das crianças e forçam o corpo a reagir. O encantamento, o descobrindo, e a magia interior são motivadas por terem aprendido algo diferente e novo. Os primeiros anos da criança são de formação, ou seja, as experiências adquiridas nesse período são significantes, e a sua influencia, característica e habilidade serão levadas em seu comportamento na idade adulta.

Citação

É o nosso infortúnio que para a grande maioria a nossa visão clara, que o verdadeiro instinto para o que é bonito e inspirador, seja diminuído e até perdido antes que nos atingimos a idade adulta.

Nossa interpretação:

O mundo de hoje está cheio de influência competitiva, por exemplo, assistir televisão e preocupações com videojogos projetados em uma tela, o qual tira a oportunidade e o tempo de desenvolver profundamente o conhecimento do mágico mundo natural. Os pais por sua vez também estão pressionados pela falta de tempo, a correria do dia a dia, as pressões do trabalho, os afazeres da casa, limitando as oportunidades para que seus filhos explorem os lugares e os prazeres de desfrutar o mundo mágico da natureza. Quando as crianças não são expostas freqüentemente e de maneira prazerosa ao mundo natural, possivelmente elas não irão apreciá-lo.

Citação

> *Se a criança for manter o senso inato da maravilha, ela necessita da companhia de pelo menos um adulto que possa compartilhar e redescobrir com ela a alegria, empolgação e mistério do mundo em que ela vive.*

Nossa interpretação:

Só é necessário um adulto empenhado e cuidadoso, alguém que a criança possa confiar e aprender, alguém que ajude ela a desenvolver um interesse ao meio ambiente natural. Este relacionamento funciona como um modelo positivo de apreciação maravilhosa pelo o mundo da natureza. E também um relacionamento flexível e interativo, sendo construído através dos interesses demonstrados pela criança como também pelas experiências de linguagem e aprendizado as quais estimulam a explorar, descobrir e entender como a natureza funciona.

Citação

> *Cuidadores, "em geral não são suficientemente preparados para lidarem com a mente ávida, e sensível da criança e por outro lado com o mundo complexo de sua natureza física... que parece impossível diminuir isto para ordem e conhecimento... (e) quando existe uma disposição de destruição própria... exclama: "Como eu posso ensinar uma criança sobre a natureza sendo que eu mesmo não posso diferenciar uma espécie de pássaro do outro".*

Nossa interpretação:

O relacionamento deve ser ao mesmo tempo de apreciação e aprendizado. Porém existe uma oportunidade para os cuidadores e professores de ajudar essas crianças a descobrirem informações sobre esse mundo maravilhoso da natureza que existe em seu redor prestando atenção nas cores, padrões, materiais naturais; ouvir os sons; pesquisar formas, texturas, pesos, perceber as ações, ritmos e cheiro, fazer perguntas sobre um assunto fascinante e conversar dando explicações possíveis, e refletir sobre perceber o que foi conversado. Crianças e cuidadores podem investigar as experiências utilizando os recursos que são disponíveis, tais como: aplicativos, guias, livros de natureza que contam

estórias sobre o meio ambiente, centro educativos de natureza, e websites, são alguns exemplos dos recursos que são disponíveis.

Citação

> *Eu realmente acredito que para as crianças e para os que cuidam delas procurando orientá-las, não é nem a metade da importância como sentir.*

Nossa interpretação:

A educação ambiental para as crianças devem ser focadas em ajudá-las a desenvolverem uma conexão emocional com a natureza e com o meio ambiente que está em sua volta. A curiosidade das crianças serve como base para construir interesses e motivações para aprender sobre o mundo natural, porém elas necessitam de ter satisfação que é gerada através de engajamento, aprendendo, entendendo e resolvendo seus próprios problemas. Essas experiências são as melhores que devem ser desfrutadas na companhia dos amados cuidadores e professores.

Citação

> *Se os fatos são as sementes que mais tarde irão produzir conhecimento e sabedoria, então as emoções e impressões dos sentidos são o solo fértil no qual as sementes devem crescer.*

Nossa interpretação:

Experiências sensoriais, afirmação e estimulação das emoções associadas com o uso do sentimento são os processos fundamentais no desenvolvimento das disposições infantis, gerando farto conhecimento e habilidade. As experiências que se repetem assim como as experiências diferentes são necessárias para o crescimento acontecer. Em caso que as emoções e as experiências sensoriais sejam menos do que satisfatórias, existe um risco que essas crianças serão ausentes e menos interessadas em se envolverem em experiências futuras.

Citação

> *Os primeiros anos da criança são o tempo de despertar a sensação de beleza, de descobrir o novo e o desconhecido, o sentimento de solidariedade, admiração.*

Nossa interpretação:

A importância da formação nos primeiros anos de vida da criança não pode ser subestimada. O apego a natureza junto com o sentimento de que a natureza é um lugar incrível para aprender, é importante para ser cultivado e preservado. O papel dos cuidadores e professores são de importância essencial a oferecer varias oportunidades que permitirão as elas a passar o tempo em ambientes naturais e agradáveis. Elas devem ser estimuladas a fazer perguntas, imaginar, pensar, observar, manipulando materiais encontrados na natureza respeitando e evitando a degradação do meio ambiente natural. Oportunidades para que elas possam expressar criativamente seus sentimentos e entendimento do mundo natural, também, são parte da experiência em desenvolver um grande respeito com o meio ambiente.

Citação

> *Quando (as respostas emocionais são estabelecidas) o significado delas será duradouro. É mais importante direcionar as crianças ao caminho onde elas querem aprender, do que colocá-las diante de fatos que elas não estão preparadas para assimilar.*

Nossa interpretação:

Nos primeiros anos, ensinar deve ser mais para ajudar a criança a desenvolver o sentimento de apreciação e grande satisfação que é gerada através da observação, interações, e descobertas pessoais sobre o mundo maravilhoso da natureza. É através desses processos de apreciação na qual elas constroem o melhor conhecimento e praticam suas habilidades. Os cuidadores e professores estão prontos para guiá-las e ajudá-las quando necessário. Juntamente, essas experiências ajudam em continuar a vontade de apreender sobre o mundo da natureza.

Citação

> *Descobrir a natureza com a sua criança é se tornar receptivo para quem está a seu redor. É aprender novamente a usar os seus olhos, ouvidos, narinas, e ponta dos dedos, abrindo os canais da impressão sensorial.*

Nossa interpretação:

Da costa norte - oeste de Oregon até a costa sudoeste da Florida, e por todo o mundo, a natureza é abundante e pode despertar na criança o desejo de aprender, podendo experimentar, quando são dados estímulos e direção no sentido de preservar e conservar o meio ambiente natural. Programas dos centros educacionais do meio ambiente são oferecidos por organizações da natureza local e freqüente viagens para lugar de beleza natural, incluindo o que está bem na frente da porta de entrada de sua casa e outros lugares que estão perto como jardins e parques, podem ser fontes de informação e inspiração para você começar.

Nós acreditamos que uma consideração positiva e elevada do mundo da natureza é o ingrediente essencial para manter a apreciação dos objetivos relacionados com os "valores, atitudes, habilidades e comportamento consistente com o desenvolvimento sustentável e efetiva participação publica em fazer decisões." (United Nations Environment Programme, 1992). Isto se refere a ambos adultos e crianças - e dever ser o ponto essencial do currículo e estratégias criativas no desenvolvimento de centros educativos para crianças, iniciativas da comunidade, e incentivando os esforços da educação ambiental.

Chamamos a todos os que têm contato com as crianças para criar "experiências que mantenham" como também "experiências mantidas" para que construam novas capacidades positivas e elevadas em consideração a natureza e ao meio ambiente. Em *Re-Connecting the World's Children to Nature (World Forum-Nature Action Collaborative for Children, Nebraska Nature Action Collaborative for Children, & National Association of Early Childhood Specialists in State Departments of Education, 2008*), idéias concretas são oferecidas para "fazer uma educação de desenvolvimento apropriado da natureza sustentável e enriquecedora, totalmente integrada ao cotidiano e a educação das crianças do mundo" (p.1). Este documento pode ser acessado sem custo através http://www.worldforumfoundation.org/wf/nacc/call_to_action.pdf. Nele, implicações tanto para o currículo e liderança em vários níveis são oferecidos. Experiências diárias não estruturadas e semi-estruturadas em grande parte em ambientes naturais, criação de acessos mais acessíveis e maiores lugares para a natureza, currículo inovador desenvolvido através de parcerias colaborativas, e adoção de políticas que fornecem suporte para o currículo integrado a natureza são algumas das idéias fornecidas no documento.

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Scaffolding as a Tool for Environmental Education in Early Childhood

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This paper describes the process of "scaffolding" as a teaching strategy in early childhood education, and demonstrates how scaffolding can promote children's learning about the natural environment. Examples of scaffolding are provided from seventy-four running record observations made over a two-year period in a nature-based preschool program. Qualitative analysis examined the extent to which scaffolding was used to support children's learning about nature; the types of scaffolding strategies used by teachers; whether high- and low-support strategies were used in specific types of situations; the effectiveness of scaffolding; and what children learned when teachers engaged them in scaffolding. Examples illustrate specific pedagogical strategies used in scaffolding. Scaffolding was used relatively frequently within the program (21% of events analyzed), and inferential questioning was the most frequently used strategy. Analysis did not reveal a pattern of high- or low-support strategies used in specific types of situations, but teachers flexibly used a variety of scaffolding strategies to support children's learning about the natural environment. Preparation of physical and social environments for effective scaffolding is discussed, as well as the role of scaffolding in socializing children to engage in a culture of inquiry.

Keywords: early childhood, environmental education, scaffolding, nature

Burgeoning interest in environmental education in early childhood has been a catalyst for sharing theories, concepts, and methods across the disciplines of early childhood education and environmental education. There is a great deal of complementarity in the philosophies, theories about teaching and learning, and best practices in these disciplines. For example, developmentally appropriate practice in early childhood education (e.g., Copple & Bredekamp, 2009), the essential underpinnings of environmental education (NAAEE, 1999), and the various guidelines for excellence in environmental education (e.g., NAAEE, 2010) share principles of active, authentic learning experiences that are integrated across curricular domains and support holistic child development. Effective practice in early childhood environmental education requires mastery of skills from both disciplines. The purpose of this paper is to sustain the synergy between these disciplines by defining and describing the process of "scaffolding," a central teaching tool in early childhood education, and demonstrating through examples how scaffolding can effectively support children's learning in a nature-focused preschool. This paper is part of a larger investigation of how experiences in nature can support children's development, what children learn about nature and natural environments, how they learn it, and what teachers do to support children's learning about nature.

Scaffolding is a metaphor that refers to the ways in which adults or more sophisticated peers provide support for children as they learn (Bruner, 1957; Wood, Bruner, & Ross, 1976; Vygotsky, 1978). Analogous to the way that scaffolding is built to just the needed level when constructing a building and then removed when the building is complete, educators engage in scaffolding by providing the necessary level and type of support that is well-timed to children's needs. Vygotsky (1978) proposed that scaffolding is most effective in the "zone of proximal development" (ZPD), or support that is calibrated to skills or knowledge that is just above that which the child already possesses, and which the child can master with support but not alone. The process of scaffolding will be further described in the following sections. A variety of pedagogical strategies for scaffolding will be identified and the roles of teachers in scaffolding will be explicated. Finally, scaffolding will be situated within the context of natural environments. The abundance and spontaneity of learning opportunities in nature make scaffolding an ideal tool for environmental education.

Scaffolding and learning in the preschool years

Scaffolding is a manner of teaching whereby the instructor assists learners in their acquisition of some skill or knowledge (Wood et al., 1976). Whether the task is solving a math problem or mastering a skill, the learner must gradually become more knowledgeable about the topic; this can be accomplished in part through the use of scaffolding. Scaffolding has proven to be particularly effective during preschool years (Jacobs, 2001). The strategy works through a hierarchical program in which the learner first accomplishes simple, "lower order" skills or problems which aid the learner in approaching progressively more difficult

(though related) topics and achieving more complicated, "higher order" tasks (Wood et al., 1976). While a certain level of intentionality and preparation is required of teachers in order to use scaffolding strategies, the teaching opportunities themselves arise spontaneously. The current study focuses on interactions between preschool children and teachers as they occurred during free play in nature and on nature hikes.

Teachers' role in scaffolding

To effectively employ pedagogical strategies in scaffolding, a teacher must adequately understand the strengths and needs of each learner and adjust his or her strategy accordingly. This is especially pertinent for spontaneous teaching opportunities when the teacher must determine what level of support the individual learner needs (Wood et al., 1976). For instance, when a new concept or skill is being introduced, the learner requires high-support strategies (O'Connor et al., 2005). High-support strategies include eliciting, giving hints, and co-participating (See Table 1; Pentimonti & Justice, 2010). Low-support strategies are used when the learner begins to show signs of maturation and progresses to "higher order" tasks. Low-support strategies include generalizing and predicting; such strategies provide relatively less assistance (Echevarria, Vogt, & Short, 2004; Pentimonti & Justice, 2010). Both high- and low-support strategies require the teacher to take a step back and allow the child to make the appropriate connections between their previously mastered "lower order" skills and knowledge, and accomplish progressively more complex tasks (Norris & Hoffman, 1990). Teachers must then adjust their scaffolding strategies accordingly as the learner constructs knowledge and skills (Tharp & Gallimore, 1998).

Teachers play an important role in scaffolding the cognitive and social development of young children (Hovland, Gapp, & Theis, 2011; Howes & Ritchie, 2002; Pianta, 1999). Teachers help to scaffold children's conceptual knowledge about phenomena and processes in nature by providing a physical environment where children can engage in play and have access to materials and experiences that provoke curiosity, exploration, and learning. For example, incorporating gardens into an outdoor play area can provide opportunities to explore and investigate insects, soil, and the life cycles of plants and animals. The presence of these organisms in the environment increases the likelihood that children will make observations and ask questions regarding them, which can subsequently be scaffolded such that children may better understand the natural phenomena. Teachers can also initiate scaffolding through strategies such as eliciting or drawing attention to relevant features of the environment.

During outdoor activities, teachers provide feedback, hints, or assistance to scaffold children's learning about their environment (Echevarria et al., 2004; Pianta, La Paro, & Hamre, 2008; Zucker, Justice, Pianta, & Kadaravek, 2010). Assistance may take the form of drawing children's attention to relevant features of the environment or to relevant features

of a particular problem. Teachers manage cooperative learning activities by providing materials, scaffolding competences, guiding children's learning objectives, and using inferential questioning (Lee, Kinzie, & Whittaker, 2012; Tarim, 2009; Zucker et al., 2010). For example, a teacher may prompt a verbal exchange with a child by saying, "Let's count how many maple trees we see." The teacher can thereby direct children's attention to observing something specific in their environment. They may use a high-support strategy, such as counting with them until they can count with less support ("what comes after 11?"), as well as provide validation ("yes, there are 14 trees") and feedback ("I think there might be less than 100"). Children can achieve more with these types of support than they could by themselves.

Preschool children learn from one another in addition to learning from their teachers. Peer interactions play an important role for young children in learning new concepts and developing social behaviors in preschool years (Damon & Phelps, 1989). Peer-supported learning, conceptualized as *peer tutoring*, is also based on Vygotsky's concept of ZPD (1978) and occurs when a child learns behaviors, concepts, or information from another child (Gordon, 2005). Therefore, it is important for teachers to provide opportunities and support for peer collaboration. Teachers create a context that is conducive to learning by providing social and emotional guidance that teaches important skills for life and promotes harmonious relationships so that maximal attention can be focused on learning, rather than behavior management (Inan & Katz, 2007; Trawick-Smith & Dziurgot, 2011).

Nature as a classroom

As children explore their environment, they develop new knowledge and connect it with their previously gained knowledge. Nature provides diverse opportunities for children to develop new concepts through interacting with nature during teacher-directed and self-directed activities. For example, a North American child learns how snow falls instead of rain at certain temperatures, butterflies fly in the day and moths at night, and to identify the living features of many animals by observing and interacting with nature (Kellert, 2005). Spontaneous exploratory play is positively associated with children's construction of knowledge concerning causal relationships (Schulz & Bonawitz, 2007). In a study by Schulz and Gopnik (2007), preschoolers were able to competently distinguish cause-effect relationships after spontaneous exploratory play with a gear toy. Likewise, children in nature activities have opportunities to develop scientific inquiry skills such as questioning about weather events, animal classifications, or plant names.

In summary, scaffolding is a teaching strategy that involves providing support for children's learning that is well-timed and well-matched to the situation and child, and that helps the child to be more successful than they would be without support. Scaffolding empowers children by providing them sufficient assistance to continue their self-directed and/or

cooperative learning. Scaffolding also promotes *intellectual autonomy*, the understanding that learning arises from one's own efforts rather than answers to problems coming from authority figures (Kostelnik, Gregory, Soderman, & Whiren, 2012). Teachers may use high-support or low-support strategies to empower children in such a way (O'Connor et al., 2005; Pentimonti & Justice, 2010).

This paper will examine teacher scaffolding of young children's learning about natural environments within a nature-based preschool from the perspective of social constructivism (Berk & Winsler, 1995; Vygotsky, 1978; Watson, 2001). According to social constructivism, learners actively construct knowledge, and language is central for co-constructing meaning and to conceptual development. Constructivist learning is situated within authentic contexts that are shaped by socially mediated cultural scripts, symbols, rules, and meanings (Winsler, 2003). Scaffolding is often conceptualized as occurring in the dialectic of a dyadic interaction (e.g., between a child and teacher), however it is important to consider multiple levels of scaffolding within which a learner constructs knowledge and meaning (Winsler, 2003). In the present study, children bring unique characteristics, experiences, and culture to the program, and they also experience the culture of the program, which in this case can be described as a culture of nature and a culture of inquiry. These features of social constructivism lend themselves to the study of teaching and learning interactions between children and teachers in a natural environment. The study will examine specific strategies used by teachers during both planned and spontaneous learning opportunities in a nature setting with special attention to verbal communication between children and teachers. As part of a larger study focusing on what children learn about nature and natural environments, how they learn it, and what teachers do to support children's learning about nature, this paper will address the following research questions:

1. Do teachers use scaffolding to support young children's learning about nature, and if so:
    a. How often is scaffolding used?
    b. What scaffolding strategies do teachers use? Do teachers use high- and low-support strategies in specific types of situations as described by Pentimonti and Justice (2010)?
    c. How effective is scaffolding? What do children learn when teachers engage them in scaffolding?

METHODS AND PROCEDURES

Rationale for a qualitative design

A case study is a qualitative approach "in which the investigator explores a real-life, contemporary, bounded system *(a case)* or multiple systems over time" (Creswell, 2013, p. 97). In a case study, researchers define their *bounded system* as what is going to be studied (Merriam, 2009). In the current study, we defined our bounded system as a preschool program in the Great Lakes region of the U.S. Researchers conducted running-record observations of children's activities during their outdoor time on seventy-four different days over a two-year period. The case study approach is well-suited for examining processes, providing rich descriptions of phenomena occurring within a bounded system, and studying phenomena in the context in which they take place (Creswell, 2013). Researchers took the role of "observer as participant," meaning that the researcher's role was known by those who were observed, but researchers also participated in activities when appropriate opportunities arose (e.g., singing along with children during a group time or holding a child's hand when crossing the parking lot during a hike). Children and teachers became very familiar with the researchers, whom they addressed in the same manner as the other teachers ("Miss" or "Mr." followed by the first name). Field notes were transcribed and analyzed according to the procedures described below.

In the current study, we used "quantitizing", using numbers to support qualitative data (Sandelowski, Voils, & Knafl, 2009). Quantitizing is used "to facilitate pattern recognition or otherwise to extract meaning from qualitative data, account for all data, document analytic moves, and verify interpretations" (Sandelowski et al., 2009, p. 210). We used counts and frequency percentages to make sense of our data and the coding of observations (Green, 2011; Maxwell, 2010).

Program description

The preschool is located within a 185-acre nature center that features prairie, hardwood forests, wetlands, and lakeshore. Children attend two, three, or four half-days per week. When the children arrive they meet their class in one of three natural outdoor play areas that feature open-ended elements such as logs, pine cones, sand, gardens, rocks, and trees. Teachers provide additional materials such as buckets, shovels, magnifying glasses, and field guides to support play and exploration. Children gather for circle time after playing for approximately one half hour and teachers introduce the concepts on which they will be focusing for that day. Concepts include topics such as camouflage, hibernation, migration, activation, or following the path that water travels to the lake. Teachers often share a story or a song about the concept with the children, and then give the children a "provocation" (Edwards, Gandini, & Forman, 1998) to focus their attention on the concept during their

hike such as listening for sounds of spring, looking for white trees, or watching for different animal tracks. The hikes typically take 45 minutes to an hour. Teachers facilitate both structured and unstructured nature experiences during the outdoor time and hike.

Participants

The preschool enrolls nine classes of children ages three to five years, with a maximum of 16 children per class. Specific demographic information was not collected for individual children, but all enrolled children come from upper middle-class families and a majority were Caucasian. Enrollment is open to any interested family and parents pay tuition for their children.

Procedures

Seven researchers conducted running-record observations of children's activities during outside activity time and while hiking over a two-year period. Forty-four observations were conducted during the first year and thirty observations during the second year. Every class was observed, but because some classes only met two days per week, the classes that met three or four days per week were observed more frequently. Observers recorded children's and teachers' behavior and dialogue in field notes which were later transcribed and analyzed. An observation comprised all recorded field notes for a single day, derived from 1.5 to 2.5 hours of observing. Each observation included multiple "events," defined as sequences of related behaviors and/or interactions. The number of events recorded per observation ranged from 1 to 29 (Mean = 8.0). The total number of events recorded was 521.

Researchers were introduced to the classes early in the year, and children were told that the researchers wanted to learn about their school. Thereafter, children appeared to accept the presence of the researchers and to be comfortable in their presence. Some children even asked researchers where they had been after they had missed a day, or asked one researcher to pass on a message to another (such as to say hello and when are you coming back).

Materials

The primary investigator (PI) designed the framework for conducting observations. An "Observation of Child Development" form was designed to guide observations that included: (1) observer name, date, time, children present, and location; (2) domains of development, including physical/motor activity, observational skills of the child, attention/awareness, exploration, social development, and self-regulation; (3) specific child behaviors to look for, such as recognizing or responding to differences in the environment,

discriminating properties of nature using a variety of senses, seeking information through observation to satisfy curiosity or seek answers to questions, asking questions or seeking information, testing possibilities, and using multiple strategies to solve problems; (4) space for detailed description of children's activity; and (5) space for the observer's interpretation and reflections, with the following probes: what is important about the observation? How did the environment support the child's development? What roles did teachers and/or peers play? The components of the guide were not designed to be exhaustive, but rather to help observers to identify sequences of events and behaviors upon which to focus.

Questions and prompts included in the form were designed to draw the observer's attention to children's behavior, teachers' behavior, features and function of the environment, and interactions among the three (children, teachers, and environment). The PI piloted the Observation of Child Development form and found it to be effective for guiding observations, but with too little space to record field notes. Therefore, the Observation of Child Development form was used as a guide but field notes were taken in a spiral-bound notebook.

Trustworthiness of the data. Several strategies were used to maximize the trustworthiness of the data. Research team members were trained and supervised to ensure consistency of the data collection method. Credibility was established through prolonged engagement, persistent observation, and triangulation of sources and analysis (Creswell, 1994; Lincoln & Guba, 1985).

Training of research team members. The PI trained the other six investigators in the data collection procedures. The PI explained the overall purpose of the study and the Observation of Child Development Form, and provided an orientation to the preschool program. The PI provided examples of completed and typed observations, which were discussed with investigators in training. A common notation format was adopted in which multiple children involved in an interaction were denoted as "C1, C2…Cn" and teachers as "T1" or "T2." Classes often had a volunteer, who was denoted as "V1." Each class had children with parental consent to participate in the study, and when target children were observed they were identified by their initials in order to compile those observations for case studies (not reported in this paper).

Investigators were instructed to focus more on quality of observations than quantity of observations; priority was given to thoroughness and level of detail recorded about a single "event," defined as a related sequence of behaviors and/or interactions, rather than to recording as many events as possible. The rationale for this operating principle was to generate richer observations that would permit analysis of associations between children's activity, learning, interactions, environments, and teachers. Investigators submitted their

typed observations to the PI and they were discussed during monthly research team meetings.

Credibility. In qualitative research, concerns about internal, construct, and content validity are addressed as "credibility." According to Lincoln and Guba (1985), "prolonged engagement," or spending enough time in the observational context to understand the phenomena of interest within that setting, is one strategy for establishing credibility or confidence in qualitative data. Prolonged engagement permits a researcher to establish rapport with research participants, increasing the likelihood of observing "natural" behaviors. Prolonged engagement also allows the researcher to compare observations across time in order to determine what is "typical" or "atypical" in the setting. "Persistent observation" is another strategy for increasing credibility, and it refers to the depth and extent of observation that enhances understanding of the phenomena of interest. Persistent observation allows researchers to observe a phenomenon of interest as well as the associations with contextual features or sequences of interactions. "Triangulation," or the use of multiple methods, sources, or analysts, is a strategy used to increase the comprehensiveness of understanding data. Two types of triangulation were used in this study. First, triangulation of sources took the form of comparing data collected by different researchers at different points in time across the two-year period. Second, analyst triangulation was used in the processes of coding and interpretation (Lincoln & Guba, 1985).

Transferability. In qualitative research, concerns about external or ecological validity are addressed as "transferability." According to Lincoln and Guba (1985), providing a "rich description" of the phenomena of interest is a strategy for establishing transferability. Detailed description of the phenomena and the context in which it is observed allows readers to determine the contexts and conditions under which they can reasonably expect the results of the research to be relevant.

RESULTS

Data reduction and analysis

Data reduction was used to analyze data from a rigorous perspective due to the large amount of observational data, common to qualitative studies (Miles & Huberman, 1994). The central research question of this paper is "Do teachers use scaffolding to support young children's learning about nature?" In order to address this question and the sub-questions, the first step in data reduction was for one investigator to read through all of the observations and extract each incident of scaffolding, using a set of preliminary codes developed from reviewing previous research (see Table 1). A total of 103 incidents of scaffolding were extracted. Next, a second investigator read through all of the extracted incidents and assessed whether each constituted an example or non-example of scaffolding.

Ninety-eight scaffolding incidents were confirmed and five incidents were questioned. The third investigator read through all of the extracted incidents, confirmed 102 of the original 103 incidents, and questioned one. All incidents on which at least two investigators agreed were coded as scaffolding incidents.

Table 1
Scaffolding Code Descriptions, Examples, and Frequency of Occurrence

Code Description and Source	**Example**	**Frequency**
Eliciting: Teacher provides a prompt, which could be a statement or question that evokes a response from the children (Pentimonti & Justice, 2010).	Teacher: "When the leaf falls to the ground, it dries all up and turns into…" Children: "Soil!"	61 (15.4%)
Inferential Questioning: Teacher prompts children to use evidence to draw a conclusion (Walsh & Blewitt, 2006).	"What happened to this tree?" "Did it fall down or did someone cut it?" "What do you see?"	101 (25.4%)
Predicting: Prompting children to make a prediction about what will happen next (Pentimonti & Justice, 2010).	Teacher: "It was wet out here last time it rained. What would happen to the water today?" Children: "It would freeze!" Teacher: "Do you know what color they will be in the spring?"	9 (2.3%)
Drawing attention to relevant features of a problem or of the environment: Prompting the child to use senses to narrow the field of observation toward a current focus of inquiry or discourse; this can take the form of a statement or question (Stanulis & Manning, 2002).	"What do you notice about…?" "Is this the same shade of blue as it was yesterday?" "Good guess but I think it's an animal that's a little bigger than a deer."	35 (8.8%)

Give hints: The teacher provides a clue to help children's ongoing inquiry (Pianta, La Paro, & Hamre, 2008).	"What animal has four toes?" "What animals do the girls in class like to pretend to be?" (children are trying to figure out what animal made the tracks that the children think look like dog tracks, but they are coyote tracks) "It starts with a MMMMMM sound."	18 (4.5%)
Provide materials: The teacher provides tools to support ongoing activity or inquiry (i.e., buckets, shovels, magnifying glass) (Plowman & Stephen, 2007).	Teacher: "What tool do you need?" Child: "The sand is hard today. I need a shovel."	2 (0.5%)
Validation feedback: A statement that communicates "yes, that's true" (Hogan & Pressley, 1997; van de Pol, Volman, & Beishuizen, 2010).	"I think it was a woodpecker too!" "Great job – I think it's a spine, too!"	52 (13.1%)
Correction feedback: When a child makes a statement that is factually inaccurate or uses a term in a way that is inaccurate, the teacher offers information to clarify the factually inaccurate statement (Hogan & Pressley, 1997; van de Pol, Volman, & Beishuizen, 2010).	"There are no dogs here." "[yes it hibernates]…but not at the bottom of the pond. It's a land turtle, and hibernates under some leaves and branches." "Nothing? I see something."	12 (3.0%)

<u>Denomination</u>: Teacher provides a precise term for a concept after a child uses a vague or incorrect term, or has not used a term (for example, pointing) (Rosemberg & Silva, 2009).	Child: "Snow keeps the plants warm." Teacher: "Snow is a good insulator!" Child: "The leaves will turn to soil." Teacher: "That's right – they decompose."	9 (2.3%)
<u>Expansion</u>: The teacher adds information to a statement the child has made (de Rivera, Girolametto, Greenberg, & Weitzman, 2005).	"Did you know that before people could go to the store to buy brooms they used branches to sweep?" (In response to a child using a branch to sweep snow, and stating "Look! It's a broom!")	53 (13.4%)
<u>Generalization</u>: The teacher names a superordinate concept (the general case) that is related to a specific exemplar identified by a child (van de Pol, Volman, & Beishuizen, 2010).	Child: "Water vapor! It goes up and it comes back down again." Teacher: "That's the water cycle that you're talking about."	3 (0.8%)
<u>Exemplary</u>: The teacher gives a specific example of a general concept named or referred to by a child (van de Pol, Volman, & Beishuizen, 2010).	*Not observed in the current study.*	0 (0%)

Link to previous knowledge and/or experience: The teacher refers to what s/he knows is the child's previous experience or knowledge in order to address a new question (Echevarria, Vogt, & Short, 2004).	"What kind of mark would a turkey make?"	29 (7.3%)
Co-Participating: (Pentimonti & Justice, 2010)	Teacher counts along with child, starting a sequence or filling in numbers	2 (0.5%)
Contextualization: "…draw the new knowledge nearer by creating new intermediate levels of representation in order to link the introduced concepts to others that children build in direct experiences" (Rosemberg & Silva, 2009, p. 575).	Teacher: "Why would it be important for there to be a hole in the top of the wigwam if there's fire inside?" Children: "So the smoke can leave!"	7 (1.8%)
De-contextualization: Distancing a concept from the current context (Rosemberg & Silva, 2009).	Teacher: "Right! It [the hole in the wigwam] works as a vent just like the vents in your house for the air conditioning and the heat."	4 (1.0%)
	Total number of coded scaffolding strategies:	**397** (100%)

Next, the second investigator returned to the raw data to determine whether there were additional scaffolding incidents that had not been identified by the first investigator. The second investigator identified an additional 11 scaffolding incidents. The third investigator confirmed eight of those 11 incidents and questioned three of them. This yielded a total of 110 incidents of scaffolding verified by all three investigators.

Extent of scaffolding used by teachers

To address the first research question, "Do teachers use scaffolding to support young children's learning about nature, and if so, how often is scaffolding used?" we compared the total number of events recorded (521) with the total number of scaffolding incidents (110) and found that 21% of all events were scaffolding incidents. Similarly, comparing the average number of events per observation (8) with the average number of scaffolding incidents per observation (1.7) revealed that 21% of the events within each observation were incidents of scaffolding. Considering that many events did not include teachers (e.g., peer interactions or individual children's behavior), this suggests that scaffolding was a relatively common feature of teacher-child interactions in this particular setting.

Scaffolding strategies used by teachers: Quantity and quality

The research question, "What scaffolding strategies do teachers use?" was addressed by examining descriptive statistics regarding the specific types of scaffolding strategies teachers used overall, and qualitatively examining the types of strategies used within selected scaffolding incidents. The total number of scaffolding codes (397) is greater than the total number of scaffolding incidents (110) because several incidents had multiple codes. Frequency counts and the proportion of all incidents that each scaffolding strategy comprised are presented in Table 1.

The most frequently used scaffolding strategy was inferential questioning, which constituted 25.4% of the reported scaffolding incidents, followed by eliciting, expansion, validation feedback, and drawing attention to relevant features of a problem or the environment (see Table 1). Providing materials and co-participating were the least frequently observed strategies, each constituting 0.5% of the 397 total scaffolding codes. One scaffolding strategy included in Table 1 was not observed. The exemplary strategy appears in the table because it is an important strategy that was identified in the literature, despite the fact that it was not observed in this particular series of observations, and because non-findings are often as important as findings.

Effectiveness of scaffolding strategies used by teachers

The research questions, "Do teachers use high- and low-support strategies in specific types of situations?," "How effective is scaffolding?," and "What do children learn when teachers engage them in scaffolding?" were addressed by qualitatively assessing children's verbal responses to scaffolding employed within the selected incidents. Below we present and analyze a selection of scaffolding incidents to illustrate the patterns of scaffolding strategies used and their effectiveness. The incidents presented progress from simple to complex, with the first examples using fewer strategies and later examples involving more strategies, the introduction of outside information, and a greater number of considerations.

C = *individual child*
C1, C2…Cn = *multiple children's individual responses*
CM = *multiple children, group response*
T = *teacher*
V = *volunteer*

The following exchange was initiated by a teacher and includes four feedback loops in which the teacher used two different scaffolding strategies which supported children's observation and reasoning skills. This example of scaffolding occurred while the class was on a hike.

> T: Look up at that tree up there – what do you notice about it? **(Draw attention)** Is there something different? **(Inferential)**
> CM: Holes!
> T: How did they get there? **(Inferential)**
> C1: Spiders!
> C2: Chipmunks!
> C3: Squirrels!
> C4: Woodpeckers! Woodpeckers love trees!
> T: What do they look for in trees? **(Inferential)**
> C: Bugs!
> T: What do they do with the bugs? **(Inferential)**
> CM: Eat them!

As seen above, the teacher began by drawing children's attention to something interesting and asking an inferential question. Children then offered different hypotheses about what might have made the holes, and engaging the group in the discussion permitted children to compare their hypotheses and ultimately arrive at an accurate answer. It was important for the exchange to continue until it was established that woodpeckers would eat bugs from

the trees, because this allowed children with different hypotheses to compare their answers with the "data" which included "holes" plus "bugs" and the knowledge that woodpeckers eat bugs. Repeated use of inferential questioning effectively helped to sustain the interaction, and children successfully solved the puzzle of what could have made the holes, and why. While it is possible for teachers to achieve their learning goal(s) in a single feedback loop (as seen in the following scenario), multiple feedback loops can aid in ensuring the efficacy of teaching depending on the level of scaffolding support necessitated by the specific situation and learner.

The following example occurred as children were throwing leaves up in the air on their nature hike. This observation also demonstrates an instance where the teacher asks an inferential question, and it particularly exemplifies the way in which teachers tend to employ combinations of scaffolding strategies.

T: Are these new or old leaves?
C: Old.
T: What are these leaves going to turn into? (Teacher pauses.) The leaves are decomposing and will turn into soil. **(Inferential; prediction; denomination)** (The suggestion is that we really should only throw new leaves up in the air to fall on us – old leaves can get you dirty.) (**Expansion** to cause-effect)

In this single, apparently simple suggestion, the teacher used four scaffolding strategies. The first question – "Are these new or old leaves?" – is inferential; the teacher is looking for the children to draw a conclusion based on the facts at hand. The teacher follows this up by using prediction, whereby the children are encouraged to think about what happens to leaves in time. Lastly the teacher answers her own question: "The leaves are decomposing and will turn into soil." This final statement is an example of denomination because the teacher offers specific terminology for the concept she has been scaffolding throughout the interaction. The progression of strategies used by the teacher, particularly the use of denomination, is moreover an instance of expansion, as she is introducing new information related to the original topic (e.g., leaves). This manner of using multiple scaffolding strategies in a single feedback loop can be an effective way of achieving multiple ends within an exchange. Children listened carefully and stopped throwing leaves onto themselves and each other, indicating they understood that the old, decomposing leaves would get them dirty.

In contrast to the previous three examples, the following interaction differs in that the teacher uses the child's question as an opportunity to engage the entire group of children in the process of inquiry by initiating discourse amongst the class, rather than responding solely to the individual child who asked the question. The exchange involves five feedback loops and repeated use of inferential questioning to sustain the interaction. The

observation was recorded while the children were at a pond. Most of the children were lying on their stomachs on the wooden dock and looking into the water. A few children had sticks they were poking down into the water, and one child noticed that the water did not go up as high on the stick as it had on a previous visit. The child asked the teacher where the water went, prompting the following exchange.

> T: Where's the water going, guys? C wants to know what's happening to it. **(Inferential)**
> C: It's going down a waterfall.
> T: Do you see a waterfall around here? **(Inferential; draw attention to details)**
> CM: Nooooo!
> T: Do you ever have a puddle in your yard? What happens to it? **(Contextualization)**
> C2: Water vapor! It goes up and it comes back down again.
> T: That's the water cycle you're talking about. **(Generalization)** What happens to the water in the puddle? Does it all go up? **(Inferential)**
> C2: It goes down in the ground…some evaporates, and some goes down in the ground.
> T: Do you think that's what's happening here? **(Inferential)**
> CM: Yes!

The teacher's strategic use of the child's inquiry as a teaching opportunity for the rest of the class empowered the children to actively take charge of their own learning. The fact that the teacher directed the question to the children, rather than answering it herself, communicates that she has confidence in their ability to reason, and also conveys that knowledge and "answers" do not come only from authority figures but from one's own intellectual activity (Kostelnik et al., 2011). Engaging the group with the question also communicates that knowledge and discovery are social processes. This strategy of engaging a group of children to investigate an individual child's question is frequently used in the program.

In this example, the teacher began with a low- to moderate-support strategy in the form of inferential questioning. The reason this is coded as inferential rather than eliciting (a lower-level strategy) is because the question required children to use information available in the environment as well as their own knowledge to make an inference about what was happening to the water. When the first child suggested a waterfall, the teacher asked a question that was both inferential and drew the children's attention to details in the environment. She waited several seconds before asking the next question, which is an example of contextualization because asking children whether they ever had a puddle in their yard served to "draw the new knowledge nearer by creating new intermediate levels of representation in order to link the introduced concepts to others that children build in direct experiences" (Rosemberg & Silva, 2009, p. 575). This helped the children to see the

similarity between what happens to a puddle in their yard and what was likely happening to the pond, which is essentially a bigger puddle. The strategy helped one child to make the inference that the water was becoming vapor, and the child demonstrated knowledge that the water vapor would rise and then come down again. The teacher then used the strategy of generalization to name the superordinate concept that is related to a specific exemplar identified by a child, in this case the water cycle. The teacher further extended the inquiry with another inferential question about whether all of the water evaporated, and a child inferred that some evaporated and some went down into the ground.

Examining this sequence of interactions as a whole, the teacher engaged children in five feedback loops and used four different scaffolding strategies calibrated to the level and type of support the children needed. She worked within the zone of proximal development to support children's reasoning, and maximized the potential learning opportunities in the situation. It is important to note that the teacher did not leave or end the interaction when the child named "water vapor," but extended the interaction further to link the child's response to a larger concept (the water cycle). The teacher then pushed the children's thinking further by asking whether they thought all the water went "up." This is an example of providing a deep and meaningful experience in which children can investigate, reflect, and elaborate on important concepts. This kind of interaction is an example of prioritizing experiences that promote deep knowledge over experiences that expose children to a large number of concepts but lack depth, as described in the Next Generation Science Education Standards (NGSS Lead States, 2013) and related documents (Michaels, Shouse, & Schweingruber, 2008). This example is also very powerful because the teacher effectively helps children to connect the new experience and knowledge with previous experience and existing knowledge. These elaborations and connections help children to construct knowledge that connects abstract concepts with specific experiences and draw parallels between similar situations. These interactions also facilitate children's development of reasoning skills (Copple & Bredekamp, 2009; Pianta et al., 2008).

It is also important to note the children's demeanor during this encounter. They were relaxed as they lay on the dock observing the water, and when the teacher engaged them with the question about the water all of the children were quiet as they considered the question. The children then listened as one child offered their hypothesis. Adults often doubt the ability of preschoolers to engage and maintain attention in extended, meaningful discussions of inquiry, but the quality of the social and physical context is a key potentiator of inquiry (Ash, 2000; Ray, Bowman, & Brownell, 2006). Moreover, children in this program are accustomed to participating in meaningful discussions about environmental phenomena, and so this is a familiar process for them. It is important for teachers who aspire to this level of scaffolding to understand that it takes time and patience to socialize children into a culture of inquiry (Kirch, 2007), but it is also important to understand that

young children are fully capable of doing so (Duschel, Schweingruber, & Schouse, 2006; Michaels et al., 2008).

The teacher in the following example demonstrates such an understanding, showing patience while repeatedly employing eliciting (a high-support strategy) in an effort to support the children's development of knowledge on the topic of trees and nesting. The teacher pointed to a clump of trees (or a tree with a split trunk), directing the attention of a small group of children.

> T: Is this one or two trees? **(Eliciting)**
> C: Two trees!
> T: Look at the bottom of it. **(Draw attention)**
> *Child looks more closely.*
> T: What are you noticing, C? **(Eliciting)**
> C: Chlorophyll!
> T: C said this tree has chlorophyll in it. It also has something else in it. Look very carefully way up into the tree. What do you think that big bundle of leaves in the top of the tree might be? **(Expansion, draw attention)**
> C: It's a nest!
> T: A nest! I think you're right! **(Validation)**

In this example, the teacher repeatedly elicited the children's ideas about the object that they were trying to identify and understand. The teacher also drew the children's attention by saying "look very carefully way up into tree." The child then focused on the tree and began hypothesizing, and the teacher validated the child's answer ("I think you're right!"). Through eliciting and drawing the children's attention to a specific feature of the environment, the teacher guided and supported children's learning about the tree. The teacher then validated the child's answer to ensure they understood the target concept.

The following example is unique in that it involves ten feedback loops, further evidencing the level of patience and persistence needed by teachers to appropriately and effectively employ scaffolding strategies. In this exchange, the teacher used strategies offering different levels of support to not only identify a feature of the environment (a male duck) but also to incorporate other concepts about the environment.

> T: We saw an animal this morning and I'm going to give you a clue, and you guess what it was. The clue is that it was partially green. **(Hints)**
> *Children guess frog, toad, and turtle.*
> V: It had 2 wings. **(Hints)**
> C: Turkey.
> C: Bird.

T: You're right; it's a type of bird. **(Validation)**
C: Flamingo.
C: Flamingos are pink.
T: And I've never seen a flamingo here. **(Correction feedback, previous knowledge)**
C: Duck!
T: Was it a mommy duck or a daddy duck? **(Inferential)**
Children guess.
T: Daddies have green heads and moms have brown heads. **(Expansion)**
C: In the Himalayas there are poison spiders.
T: Click on your listening ears. Why do you think the mommy ducks are all brown? **(Inferential)**
C: To blend in.
T: Yes, to blend into what?
C: Grass, twigs, leaves. **(Inferential, contextualization)**
T: What's that word that means blending in? It starts with a "C" sound **(Hint, denomination, previous knowledge)**
C: Camouflage!
T: That's right, and when the mommy sits on the eggs she needs to blend in. **(Validation, expansion)**
T: They saw the daddy duck. The mommy duck might have been there, but she may have been camouflaged. We'll have to see.

The teacher did not ask or name the animal in the example above, but instead provided hints to let the children guess and reason about it. The teacher started giving hints about general features of the animal and proceeded to hint about specific features. The teacher then used validation feedback to scaffold a child's response, validating their statement by saying, "You're right, it's a type of bird" (we differentiated between validation and correction feedback in data for the current study). The teacher also referred to previous knowledge and experience, stating that she has not seen any flamingos at the nature center. The teacher maintained the children's attention and helped them to narrow their focus by asking inferential questions. These types of questions also helped children to correctly identify the animal.

The next exchange occurred on a nature hike. The teacher used a variety of strategies to explore the insulating properties of snow, support the children's reasoning, provide an experiment for the children to test their knowledge, connect to previous knowledge, provide specific terminology, and both generalize and contextualize the concept.

T: See how warm your face is when it is inside the snow! What kinds of houses are made of snow? **(Draw attention to details; link to previous knowledge; de-contextualization)**

C1: Igloos!
T: Do you think that igloos would stay warm? **(Inferential)**
C1: Yes!
T: That's because snow is a good insulator! **(Generalization; denomination)**
C2: (He speaks with his head in the snow. His words are hard to hear.)
T: C2, the snow is so great of an insulator that we could barely hear what you said! **(Contextualization)**

This observation exemplifies the teacher using a variety of scaffolding strategies to facilitate the children's learning. The teacher began the dialogue by drawing attention to a relevant feature of the environment, specifically the insulating property of snow, prompting children to use their senses to narrow the field of observation toward the focus their inquiry. It is common for teachers to use this strategy on nature hikes and in the play area as it allows for many common occurrences to become effective learning opportunities. The teacher then asked, "What kinds of houses are made of snow?" thereby de-contextualizing the information such that the children could grasp the new concept when it was removed from its original circumstances. The combined use of drawing attention and de-contextualizing the concept is also an example of the teacher connecting the subject matter to previous knowledge that is familiar to the children, the insulating property of snow. The accurate response of "Igloos!" by C1 indicates the efficacy of that connection to previous knowledge. The teacher then scaffolded the connection through inferential questioning, which also proved effective. C1 acknowledged that an igloo would indeed stay warm. At that point, the teacher employed generalization and denomination to show that all snow is a good insulator (not just in the case of igloos) and give the children a precise term for the property they had described: "insulator." C2 responded to that generalization by sticking his head in the snow, testing whether it was in fact a good insulator. The teacher then contextualized the information (after initially de-contextualizing the topic), bringing the strategy full circle. Her decision to employ contextualization demonstrates an attempt to show the children how their newfound knowledge of the terminology can be applied in their own lives, outside the context of igloos (Rosemberg & Silva, 2009). The strategy was prompted in part by the act of C2 talking with his head in the snow. Through employing seven scaffolding strategies and four feedback loops, the teacher effectively supported the children in their understanding of snow as a good insulator.

DISCUSSION

This paper described how scaffolding can effectively support children's learning in a nature-focused preschool, and provided several examples of strategies that can be used in a variety of EE contexts. Scaffolding was observed relatively frequently in the current study, comprising 21% of all observed events. The prevalence and complexity of scaffolding is particularly remarkable considering that observers were not trained to focus specifically on

scaffolding pedagogy. Observers were given general guidelines but individually determined what was salient to record within the contexts as incidents occurred. The extent and nature of scaffolding at the nature center became apparent upon examination of the many dialogues among teachers and children. Inferential questioning was the most frequently used strategy, followed by eliciting, expansion, validation feedback, and drawing attention to relevant features of a problem or the environment. The exemplary strategy was not observed. Its absence may be a result of preschoolers primarily asking questions about their immediate experiences, rather than about overarching concepts. Use of the exemplary strategy by teachers may increase as children get older and ask more questions about general concepts or words they may have heard.

Qualitative analysis did not reveal a pattern of differentiating high- and low-support strategies being used in specific types of situations (e.g., high-support strategies used when engaging more complex concepts). Instead, teachers in this study flexibly used a range of strategies to match the apparent needs of the children at the time. This involves patience and persistence, as illustrated by the number of feedback loops used in some of the examples. Additionally, teachers often sustained interactions after a child arrived at a particular “answer” or solution to a problem (e.g., water vapor or an animal “blending in” with the environment), which provided extended opportunities to construct a more detailed understanding of concepts and phenomena. In order to provide rich environmental education experiences that are consistent with the various guidelines for excellence in environmental education (NAAEE, 2010) and the Next Generation Science Standards (NGSS Lead States, 2013), it is important for teachers to understand the importance of engaging in this extended process and to develop skills to engage children in extended inquiry discussions.

Although scaffolding is, of necessity, spontaneous, intentionality and preparation are necessary for effective scaffolding to occur. Early childhood teachers must prepare a physical and social context that is conducive to learning (Inan & Katz, 2007). Teachers should provide an enriched physical learning context where children can easily access learning materials and engage with them. Providing a supportive social context promotes social competence as well as opportunities to scaffold children’s learning. Teachers need to observe children and listen closely to be aware of, and capitalize on, opportunities for scaffolding. It is important to understand the strengths and needs of each child in order to anticipate scaffolding opportunities and to match effective strategies to specific learning situations. Teachers in this study often facilitated group discussion by addressing a child’s question to the entire class. This is a particularly effective strategy, as it gives children an opportunity to verbalize their understanding to each other and compare their hypotheses or representations. Teachers facilitated children’s expression of ideas and their listening skills, for example, by inviting one child to share a question with the whole group and asking the group to listen to the individual child’s ideas. These discussions also conveyed the social

nature of science, and helped to socialize children into a "culture of inquiry" in which questioning, investigation, and discovery are highly valued. A culture of inquiry develops

over time, and it is important to be patient as children gain the social, emotional, and cognitive skills to participate in that process of inquiry.

This paper focused on teachers' scaffolding of children's learning about the natural environment. Scaffolding, however, can also take place in peer-to-peer interactions and this can support the learning of the more competent peer as they take the role of teacher or mentor, as well as the less competent peer (Tudge & Rogoff, 1999; Wertsch, 1999). Inquiry discussions also can promote children's self-efficacy in the domains of environmental education and science, as children come to realize that answers to their questions or problems come from their own mental activity that is made visible to them through the discussion. Inquiry discussions can also help children to examine questions from multiple perspectives.

Teachers in this study effectively connected children's current experiences with their past knowledge or experiences ("do you ever have a puddle in your yard?") in naming a superordinate concept represented by a specific example ("that's the water cycle you're talking about"; Van de Pol et al., 2010); drew children's attention to relevant features of the environment ("do you see a waterfall around here?"); provided corrective feedback ("I've never seen a flamingo here"); gave hints ("it had two wings"); and asked inferential questions ("why do you think the mommy ducks are all brown?"). These strategies effectively helped preschool-aged children to develop their understanding of the natural environment, which is Guideline 4.3 of the *Early Childhood Environmental Education: Guidelines for Excellence* (NAAEE, 2010). Engaging in exploratory play also supported children's learning about nature (Lee et al., 2009), as they had opportunities to observe and interact with natural phenomena such as the water in the pond, the decomposing leaves, a nest, and snow, which are examples of Key Characteristic 3 of the ECEEGE (NAAEE, 2010). Exploratory play has a central role in environmental education in early childhood, as children can investigate and reflect upon phenomena of their own interest and in a playful way (Gelman, Brenneman, MacDonald, & Roman, 2010; Wilson, 2012), allowing them to elaborate on important concepts in ways that are meaningful to them.

Limitations and future directions

While measures were taken to ensure the credibility of data and analyses (e.g., triangulation of sources and analysis), there were limitations to the study. Researchers gathered the observations and individually decided which interactions were significant to record. While the "Observation of Child Development" form provided guidance, there remained the potential for variability between researchers. Future research should address this potential threat to validity by having at least two researchers simultaneously conduct

observations or by capturing video that can be coded by multiple researchers. Teacher interviews could also be used to triangulate the observed teaching strategies.

Another limitation in the current study is that children observed came from affluent families, and teachers at the preschool program exceeded the minimum level of education required by the state in which the program was located and therefore may not generalize to other preschool programs. These characteristics of the case under investigation in this study limit the generalizability of findings (the extent to which we can conclude that scaffolding occurs in other programs and the degree to which it is effective), but not necessarily the transferability of findings (evidence that scaffolding can be a useful pedagogical tool for early childhood EE) (Creswell, 2013). However, future research should investigate a broader and more diverse sampling of early childhood education programs that include teachers with a wider range of educational backgrounds and children of diverse demographic backgrounds. In addition, the ratio of teachers to children also exceeded the minimum required by the state (1:10 for children ages 3-4 years; 1:13 for children ages 4-5 years; Wisconsin Department of Children and Families [WDCF], 2009). The maximum class size was 16 children and there were always two teachers. Scaffolding may be less frequent in larger groups or when the ratio is smaller.

CONCLUSION

In the current study, teachers fostered a culture of inquiry in their classes, prompting children to engage with their natural surroundings, ask questions, and make connections with past knowledge and experiences. The culture of inquiry observed is consistent with the physical and social context described by Inan and Katz (2007) as necessary to facilitate learning. Context is especially pertinent to considering the use of scaffolding, a pedagogy that requires teachers to calibrate the level of support they offer within each individual learner's zone of proximal development (Vygotsky, 1978). Indeed, the importance of teachers knowing their children, and the level of support necessitated by different situations must be emphasized. Additionally, knowledge of a variety of scaffolding strategies is also necessary to effectively scaffold children's learning. Evidence from this case study suggests that the teachers in this study understood the strengths and needs of the children in their classes and were familiar with children's previous experiences. They were able to adjust the level and type of support necessitated by differing contexts and learners to effectively scaffold the children's learning.

Teachers in this study were adept at flexibly utilizing a range of scaffolding strategies to promote young children's environmental learning. Analyses indicate that scaffolding can be an effective strategy for supporting young children's learning about the natural environment. Scaffolding strategies were regularly employed by teachers at the nature center to aid children's learning in a variety of contexts. Some strategies were observed

more than others (e.g., inferential questioning), an occurrence that may be a result of preschoolers inquiring about their immediate experiences, as opposed to overarching concepts that tend to engage older children. Examination of the effectiveness of scaffolding early childhood environmental education in a variety of settings is an important question for future research.

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Young children's opportunities for unstructured environmental exploration of nature: Links to adults' experiences in childhood

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Outdoor environmental education and provision of unstructured exploration of nature are often forgotten aspects of the early childhood experience. The aim of this study was to understand how adults' early experiences in nature relate to their attitudes and practices in providing such experiences for young children. This study surveyed 33 parents and early childhood educators at an Australian university-located early childhood service about their own childhood experiences in nature and their current provision of such experiences with their children. Participants completed an online questionnaire consisting of the Nature Relatedness Scale – Short Form (Nisbet et. al, 2009; Nisbet & Zelenski, 2013) and the Inclusion of Nature in Self Scale (Schultz, 2002). Questions regarding adults' knowledge and behaviour on gardening and sustainability topics were also included. Results indicate that although most participants were strongly engaged in unstructured nature experiences as children, few of them provided such experiences for their children. Implications for environmental education in early childhood settings and the home setting are discussed.

Keywords: connection to nature, nature experiences, early childhood, outdoor education, risk taking, childhood experience, environmental education

Environmental sustainability is a growing global concern, as humans are currently living beyond the available resources in the world. According to Chawla and Flanders Cushing (2007), education for children, families, educators and the community around maintaining our natural resources is the key to making substantial changes in practices. Research indicates that modelling of attitudes toward environmental sustainability by adults, and rich, direct experiences in the natural environment contribute to children's development of environmental attitudes (Chawla, 1998). In fact, adults who show sensitivity in their attitudes toward the environment are likely to self-report that their early experiences in the natural environment contributed to their attitudes (Chawla, 1998). Children must develop inter-relationships with people and places in order to develop a deep concern for their environment and engage in sustainable practices (Wilson, 1984). In order to be effective, environmental education needs to give children a sense of wonder about the natural world in which they live, as well as a sense of joy in being in that natural world (Campbell & Jobling, 2012). However, many children today fail to experience regular opportunities to connect with their natural world, resulting in a "disconnection" from nature (Davis, 2005; Louv, 2005). This is unfortunate as studies have indicated that children gain their most powerful understandings of their natural environment through direct exploration of the environment (Lekies & Beery, 2013; Thomas & Thompson, 2004).

E.O. Wilson (1984) helped to develop the modern concept of "biophilia" as the idea that humans have an innate connection to other life and the natural world. This suggests an evolutionary connection to nature is expected as a usual state for humans, though debate does continue (Joye & van den Berg, 2011). The concept of connection to nature has been expanded upon and studied by environmental psychologists and behaviourists who debate if the connection is an innate emotional connection, cognitive construct or both (Perrin & Benassi, 2009). Connection to nature seems to hold its greatest value as a predictor variable for pro-environmental attitudes and pro-environmental behaviours (Brügger, Kaiser, & Roczen, 2011; Mayer & Frantz, 2004; Nisbet, Zelenski, & Murphy, 2009; Schultz, Shriver, Tabanico, & Khazian, 2004), but may also have implications in terms of physical and mental health in urban areas (Conn, 1998; Hartig, Evans, Jamner, Davis, & Garling, 2003; Van Den Berg, Hartig, & Staats, 2007).

Connection to nature in early childhood

If connection to nature is something innate and fixed then it cannot be changed. If it is mutable, then can connection to nature be increased or even decreased by external factors? As it turns out, many authors have posited that connection to nature is partially innate and partially mutable and that it influences to a certain extent a person's environmental attitudes and behaviours (Brügger, et al., 2011; Mayer & Frantz, 2004; Nisbet, et al., 2009; Schultz, et al., 2004). It has been suggested that effective environmental education, or simply quality time spent outdoors, could increase connection to nature in individuals (Ernst & Theimer, 2011). Outdoor education seeks to connect participants, largely children, with the natural world through both exposure in

activities such as camping, bushwalking and hiking, and intense outdoor experiences such as mountain climbing and survival skills. Environmental education tends to use more subtle approaches, through scientific investigations in the outdoor environment, guided nature walks, and explorations of natural environments in order to develop environmental knowledge and thinking skills.

Children experience nature through exploration of the world around them but are limited by the opportunities provided to them by adults. Classic work by Chawla (1999) shows that many ecologists remember experiences outdoors as children and even note these experiences as one of the reasons why they chose their current careers. These stories can also be found anecdotally, including an unusual story about shooting seagulls on the beach which illustrates the experiences in nature and even destruction of nature experienced by a young John Muir that helped him to develop as a conservationist (Sobel, 2012). Sobel goes on to suggest this ability to be destructive with nature may even help to increase a child's connection to nature (2012).

Louv (2005) suggests people in many western cultures lack exposure to the natural world to such an extent they are suffering from "nature-deficit disorder." This disorder derives from lack of exposure to nature impacting the person's ability to function. Indeed, many studies have shown health benefits for individuals who spend time in nature, including greater attention (Kuo, & Taylor, 2004), increased sense of well-being (Nisbet, et al., 2011; Zhang, Howell & Iyer, 2014) and better overall health (Keniger, Gaston, Irvine & Fuller, 2013). If, in fact, humans are suffering from nature-deficit disorder, it would seem reasonable that this lack of exposure to nature is causing it. Reasoning suggests that outdoor exposure is the solution, but a large collective assumption exists that simply taking children outside and talking about the environment should fix this disconnect, particularly with "careful planning and facilitation of the nature experience" (Preston, 2004, para. 4). If this is the case, then with increased outdoor exposure, connection to nature should increase. This increase should also result in an increase in positive environmental attitudes and positive environmental behaviours over the long term.

The family environment and experiences in nature

Malone (2007) argues that due to parental anxieties, many middle class parents in Australia restrict children's outdoor activities to the point that it negatively affects their social, psychological, cultural, and environmental knowledge and skills. For example, a national study found that 1 in 20 Australian children reported never leaving inside their homes to play (Allen & Hammond, 2005). In another study involving four to eight year old children living in Victoria, cameras were given to children to reflect the places they went and activities in which they participated. Half of the 50 children included pictures of driving in the backseat of a car (Malone, 2006). It can be argued that "protectionist paradigms" of parenting and the phenomenon of "bubble wrapping" children is dramatically affecting children's experiences of their environment and their foundation

for environmental knowledge (Malone, 2007).

Chawla and Cushing (2007) have shown a convincing relationship between extensive childhood experiences in nature and the formation of pro-environment beliefs and lifestyles later in life. Research findings suggest that participation in nature activities during childhood, as well as examples of parents, teachers and other role models who show an interest in nature, are key factors that predispose people to become interested and active in nature in the future (Chawla & Cushing, 2007). Research has shown that adults repeatedly attribute their environmental interests or action extended time spent outdoors in natural areas during childhood, as well as parents or other family members who role-modelled action in the environment (Chawla, 1999). In a study of adult environmentalists in Norway and the US (Chawla, 1999), it was found that most attributed their early childhood experiences and experiences within the family as being important to predisposing them to particular attitudes regarding nature. This, then, influenced them to take up career opportunities in the environmental field.

The early childhood education environment and experiences in nature

Although there has recently been an emphasis by researchers on school-based environmental education, there has been very little research focused on early childhood education and environmental education (Elliot & Davis, 2009; Edwards & Cutter-Mackenzie, 2011). However, the importance of environmental sustainability and connection to nature are emphasized in Australia's national early childhood curriculum document, The Early Years Learning Framework (EYLF) (Department of Education, Employment and Workplace Relations [DEEWR], 2009). Environmental education is referenced in relation to 'Learning Environments' as an aspect of practice, and as a subcategory of Learning Outcome Two: 'Children are connected with and contribute to their world' (Edwards & Cutter-Mackenzie, 2011). This outcome refers to a specific subcategory of environmental education; namely, 'children become socially responsible and show respect for the environment'. The emphasis on environmental education in the EYLF highlights recent policy developments in which environmental education is viewed to be important in children's early learning experiences (Department of the Environment, Water, Heritage and Arts, 2009; United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2008). Despite the emphasis on environmental education in the EYLF, Elliott and Davis (2009) argue that there are very few early childhood centres or kindergartens in Australia (and internationally) that demonstrate exemplary environmental education and sustainability practices.

Research aims

Children today have fewer opportunities to spend time in nature compared to 20-30 years ago and often, this time in nature requires explicit and purposeful adult planning (Golden, 2010; Torquati & Barber, 2005), possibly resulting in 'Nature deficit disorder' (Louv, 2005, p. 36). Early childhood is a critical time to encourage children's

connectedness to nature because it is a time where children are naturally curious (Torquati, Gabriel, Jones-Branch, & Leeper-Miller, 2011). Experiences in the natural world can help children understand life cycles, make predictions, understand seasons, and develop an awareness of the interdependence between plants, animals, rain and sun (Torquati et al., 2011). Captivating children's interests in nature during early childhood, particularly within the family setting, can nurture positive dispositions toward nature that can last into adulthood (Chawla, 1998).

Based on this evidence, the aims of the current study are: to explore beliefs, behaviours and practices related to exploration of the natural environment. Specifically, we seek to understand how adults' early experiences in nature, particularly unstructured experiences, relate to their attitudes and practices in providing such experiences for young children.

METHODS

This research project was funded by an internal University sustainability grant, titled "Green Kids: Developing Children's Knowledge of Environmental Sustainability Through Learning About Bush Tucker and Bush Walking." Ethics approval was obtained by the university ethics committee. Informed consent was explained in detail in the initial advertisement. Implied consent was granted by submitting anonymous surveys. All participants were advised that they were able to terminate participation by contacting the researchers at any time during and after participation in the research study. Anonymity was maintained by assigning numeric codes to each survey.

Data gathering

Staff and families were located in a regional city in New South Wales, Australia, which has a population of approximately 88,000 people. Seventy three families (including thirteen staff members) from an early childhood service on the university campus were invited to participate. Information sheets were emailed to families and hard copies were distributed to staff pigeon holes. A link was provided for participants to access an online survey via SurveyMonkey.com if they chose to participate.

Staff and parents completed the Inclusion of Nature in Self Scale (Schultz, 2002) and the Nature Relatedness Scale – Short Form (Nisbet et. al, 2009; Nisbet & Zelenski, 2013) One of the first scales used to measure connection to nature was the Inclusion of Nature in the Self (INS) scale (Schultz, 2001, 2002). This scale consists of one pictorial question and builds upon the earlier scale for inclusion of other in the self (IOS) developed to evaluate interpersonal relationships (Aron, Aron, & Smollan, 1992). This scale has been widely used and evaluated and consistently scores well for reliability over time (Bruni, Fraser, & Schultz, 2008; Liefländer, Fröhlich, Bogner, & Schultz, 2012; Schultz, 2002). The Nature Relatedness (NR) scale was created by Nisbet, Zelenski and Murphy (2009) to create a more deep understanding of the "affective, cognitive, and physical relationship

individuals have with the natural world" (Nisbet et al., 2009). This scale is a relatively new scale and has been used on a limited basis, though more examples continue to emerge in the literature of its use (Nisbet, Zelenski & Murphy, 2011). The philosophical concept behind these scales encompasses the historical and modern idea of connection to nature and attempts to capture empirically that which has previously been captured anecdotally and qualitatively. These responses and those of other quantitative questions are described using descriptive statistics.

Questions regarding adults' knowledge and behaviour on gardening and sustainability topics were also included. Two items from the full-length survey are presented. "Do you have memories of spending meaningful time outside as a child?" and "Describe the ways in which you create opportunities for children to learn about nature and environmental sustainability." Identifying information (eg. Names and Towns) was removed during data analysis. Data were systematically reviewed to identify themes within each set of answers to the questions and coded, then analysed for overarching concepts within the data (Glaser & Strauss, 2009) that might connect underlying themes between the two different questions and the responses.

RESULTS

About the sample

The survey was distributed as noted above to approximately 73 parents and educators at the early childhood service for children ages six weeks to six years. A total of 33 responses were received, for a return rate of approximately 45% but not all participants answered all questions. All but one respondent was female (n=31 female, n=1 male), and all had finished at least Year 12, with 12 having obtained a postgraduate degree of some kind. The survey participants consisted of about two thirds parents of children attending the early childhood service and about half staff with some overlap due to parents who also worked at the centre.

All participants chose important, 4, or very important, 5 (n=32) to the question: 'How important is it to you that children gain experiences outdoors in nature?' with a mean response of 4.94 (sd=0.25). This sample represents a group of parents and teachers who are highly educated and who want children to have experiences outdoors in nature. These results may not reflect those of a sample of parents and teacher who are not similar in gender, education, locale and importance placed on natural interaction.

Connection to nature and environmental behaviours

Out of this sample, 32 participants completed the two connection to nature scales included in the online survey. This group of parents and educators averaged a 3.99 (sd=0.75) out of 5 on the NR Short Form scale and a 4.5 (sd=1.37) out of 7 on the INS scale. These results indicate our sample may be more connected to nature overall,

though a comparative sample is unavailable. The early childhood service is located on a university campus marketed as sustainable, so therefore may attract parents and teachers who are more connected to nature overall.

The respondents to this survey also seem to place strong positive values on the environmental behaviours indicated in Figure 1. Parents and early childhood educators think each of the environmental behaviours listed are at least 'somewhat important' with the exception of 'buying organic food' and 'alternative transportation.' These results are not unexpected given that results of a similar survey with residents local to this suburb also placed less importance on these two factors (Laird & Black, 2013).

Caring and gardening

The respondents were quite familiar with caring activities and only five indicated they did not garden as children and only six did not give examples of their gardening experiences. Almost all respondents to this survey, indicated that they have taken care of an indoor plant (n=32) or a household pet (n=31) (see Figure 2). More than half had taken care of chickens and farm animals and planted trees, ornamental plants and vegetable gardens. Only a small percentage had ever taken care of native animals, but in Australia this sort of care might require a special license or certification and would not be common. Some of the gardening experiences are included in the discussion below regarding open-ended responses. It should be noted that gardening experiences for children are largely supervised by adults, but that they could classify as a structured or unstructured activity in which children participate. The structure of a gardening activity largely depends on the adult supervising the activity and the amount of freedom they provide to the children to explore, pick and dig. Here we assumed gardening was a more unstructured activity, as it was managed in that way at the early childhood centre participating in the study.

Parent and teacher childhood experiences and opportunities they create for children

This section discusses two open-ended response questions used for analysis in this paper. Parents and teachers were asked to describe their outdoor experiences as children and in a separate question in the survey described current opportunities they create for children outside. Results were grouped into themes and described below.

Caring activities including helping in the garden or with the animals. About half of the survey respondents (17) indicated that they provide opportunities for children to help in the garden or feed the animals in caring activities. Many indicated strong encouragement for children to participate in caring activities specifically for the purpose of caring about the earth. One respondent noted,

'It is important that they get to grow and care for and become responsible for their local environment so they can develop ideas about the greater environment around us.'

Other caring behaviours were more simple and involved direct action such as one respondent who noted a simple caring act:

'*We rescue worms from the gutters and put them on the garden at home.'*

Many respondents noted they have their children help with gardening duties or feeding animals such as chickens. Caring for gardens and animals was reflected in the childhood memories of experiences parents shared. Approximately one third of respondents (10) indicated that they had childhood memories of experiences caring for plants or animals. Childhood experiences of respondents included helping parents or grandparents in the garden, helping collecting firewood for winter and feeding or caring for livestock, including chickens.

Consumptive behaviours and collecting. Eight participants indicated that, as children, they participated in consumptive outdoor behaviours, such as berry picking or harvesting, but only half of that number indicated they provide that same experience for children. Adults remembered such activities as "fishing for yabbies," "picking feral fruit," "collecting eggs," and "catching anything and everything." Three participants noted they provide opportunities for children to pick fruit or vegetables from a garden and one noted "catching yabbies" as something they encourage children to do while outside.

Destructive or constructive play. Fourteen participants indicated they had, as children, engaged in some sort of engineering destructive or constructive behaviour, such as cubby house building, digging, making "things" and artistic creations and catching bugs. Specific experiences recalled include "using plants (particularly flowers) in our dramatic play," "digging holes and burying objects," "playing with insects," and many mentioned building and making their own cubby houses and one even noted "building bunkers underground." Opportunities provided to children for destructive or constructive behaviour were less common (11 participants). Noted were: "make things," "making collages from natural things we find on walks," and "digging in the garden," and "making piles out of rocks." A few participants noted encouraging the opposite of destructive behaviours, such as "bug catchers but then letting them go" and "respect for animals and plants (gentle behaviours)."

Appreciation, enjoyment, spiritual (includes bushwalking). Twenty participants indicated they enjoyed their experiences outdoors as children, either spiritually, just that it was fun or that they were walking aimlessly to enjoy being outdoors. Specific examples include "going for walks with siblings," "walking barefoot," "spend all day outside playing in the trees," and "lying on the soft grass looking up at the sky." One

participant even said directly, "I really enjoyed playing outside as a child." Only 8 respondents indicated that this sort of experience is one they try to provide for children. These responses mostly consisted of noting bushwalks or playing outdoors for enjoyment. One adult noted,

"I think he really enjoys this one on one time with nature, where he is allowed to just 'be' with nature."

Unsupervised exploration or freedom. Nineteen participants indicated that unsupervised play, exploration and freedom were part of their childhood experiences outdoors in nature, but only 6 participants indicated they try to include these experiences into what they provide for children. Recalled experiences included memories such as, "played in the farm paddocks at the end of our street," "childhood spare time was spent in the bush," "leaving the house and not returning until dinner time," and "being able to roam free, explore." Many participants noted that they feel like they spent a lot of time or a large percentage of their childhood outdoors. There were at least two adults who recalled being "locked outside" daily to play particularly during the summer. Many of the opportunities provided for children fell under the idea of allowing children to explore their environment, but only one participant noted they allow children to have time free of supervision.

Along with this concept of unsupervised play, there was also a sense in the childhood experiences, mentioned several times by the participants that they learned about awareness, limitations and control of their own bodies through their explorations outdoors as a child, including a sense of pride in achievements. This aspect of outdoor play was not listed as something provided in experiences for children.

Teaching about the outdoors. Many participants indicated they try to provide lessons for children while outdoors, but no one remembered an experience where they were outside as a child with an adult who provided similar lessons. Examples of opportunities noted include, "looking and talking about the trees, birds, sky, etc.," "explaining to them why what we are seeing is important," "need to understand the needs of the environment where we live," "we show him things/animals and explain what they are and what they do" and that nature is the "best place to learn and experience." The focus of these comments is overwhelmingly using nature to illustrate points about the environment and sustainability to children. The answers seem to indicate there is a good deal of time spent telling children why nature is important while outside.

DISCUSSION AND CONCLUSIONS

The participants in this study expressed a strong connection to nature themselves and valued children having experiences outdoors in nature. They also had rich experiences in the outdoor environment and fond memories from their own childhoods of being

outdoors in a variety of situations. According to previous studies, a feeling of connection to nature predicts pro-environmental attitudes and pro-environmental behaviours (Brügger, et al., 2011; Mayer & Frantz, 2004; Nisbet, et al., 2009; Schultz, et al., 2004) and formative outdoor experiences predict pro-environmental behaviours as well (Chawla, 1998; 1999). Thus, it is surprising that although the participants in our study discussed various ways they encourage experiences with nature for children, they did not emphasise unstructured exploration of nature, even though they themselves had fond memories of this as children.

In line with Davis (2005) and Louv (2005), our sample seems to reflect a decrease in unstructured, unsupervised play in the outdoors, with participants indicating that although they had many unstructured experiences in nature as children, they may not be providing similar experiences for today's children. Although they reported that they encourage children's experiences in nature, these experiences were largely supervised and structured. What are the impacts of this lack of independent exploration and freedom in the natural environment?

Sobel (2012) suggests that the "don't touch" mentality of many environmental educators has created a situation where children do not get the chance to participate in the destructive play so often described by many older generations in their childhood stories. Our data show this destruction was a common experience for participants in their own childhood, yet they reported providing limited opportunities for children to do the same. Even when catching bugs, there is sure to be a lesson for the child in "respect for animals and plants (gentle behaviours)."

In addition to promoting an appreciation for nature, unsupervised outdoor play may also promote risk taking behaviour. Risk taking experience in early childhood is now seen as crucial for developing a well-rounded ability to accurately assess potential risks as children get older, as well as developing social competence (Greenfield, 2004). Tranter (2005) suggests that children need freedom to take risks in play because it allows them to test their own limits in the physical, social and emotional domains. There is some concern that children do not currently participate in risk-taking experiences until much later in life. Little and Wyver (2008) suggest that adults' fears about the unknown and concern for children's safety has resulted in overprotective parenting, whereby risk taking behaviour is discouraged. Furedi believes this perception of risk as something bad that needs to be avoided is a recent phenomenon, whereas once 'taking risks was seen as a challenging aspect of children's lives' (Furedi, 2001, p. 25).

Our findings related to unstructured experiences in nature also have implications for early childhood education settings. In the present study, gardening, animal care, bush walking and general free play in nature were identified as important learning opportunities for children, which must be facilitated by early childhood educators. However, although such unstructured experiences in nature are recognised as being

important for children, with the current focus on health and safety, as well as fears of litigation in early education settings today, unsupervised and unstructured play is not always encouraged. New, Mardell and Robinson (2005) suggest that these concerns are seriously impacting on early childhood educators' provision of activities and opportunities for risk taking behaviour. 'Whether out of fears that children will actually come to serious harm or, more likely, to avoid accusations of irresponsibility, teachers now maintain constant supervision over children's activities even as they discourage or avoid potentially "unsafe" activities' (New et al., 2005, p. 4). The problem with limiting such opportunities is that it denies children the opportunity to learn about risk and how to manage it in the real world (Shepherd, 2004).

The present study does have some limitations which will impact generalizations of the findings. Firstly, the sample was very highly educated and was drawn from a children's service situated on a University campus known for its emphasis on environmental sustainability. Thus, this study could be replicated at different centres with variable socio-economic and demographic representation and data compared between the two groups. Secondly, it was not possible to ascertain which participants were parents and which were educators. Future studies could examine more specifically how families and early childhood educators can work together to support authentic experiences for children in the natural environment, with an emphasis on an awareness of sustainable practices. Additionally, the perspectives of career educators could be incorporated into future studies to elucidate ways in which regulations have impacted upon children's nature exploration and risk taking opportunities.

The importance of allowing children to have unsupervised access to natural play areas is still being determined by researchers worldwide. In Australia, it seems that little progress has been made towards creating "unsupervised" play opportunities for children in the early childhood setting. As adults begin to remember their own childhood experiences outdoors and feel the excitement they once felt at building their first cubby house or finding their first beetle, it can be difficult to understand why they do not want similar experiences for their own children. Perhaps more emphasis should be placed on working through environmental education with parents and families in order to educate them on how to create wild play areas in their own backyards, blocks or local parks. Much more research is needed to understand if these early childhood experiences with unsupervised nature play can create a citizenry more connected to nature and the land and more importantly to see if children lacking these experiences will become as excited about the environment as previous generations and still seek to protect it.

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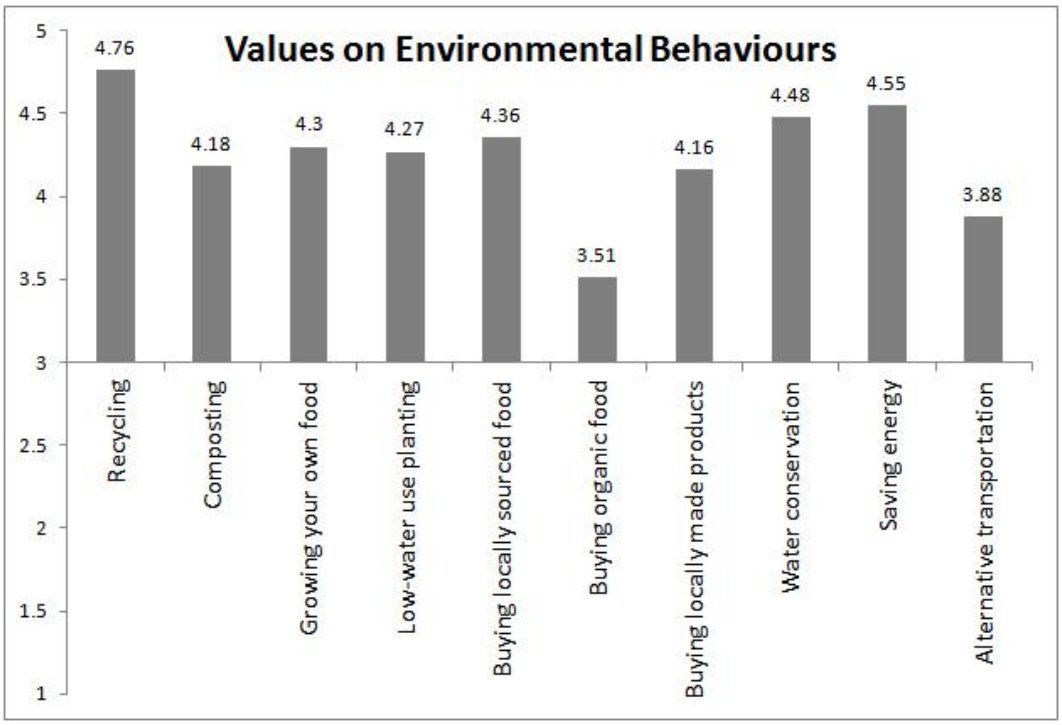

Figure 1. Values on environmental behaviours. Each respondent was asked how important each environmental behaviour was to them (n=33), with a 5 indicating it was “very important” and a 1 indicating “very unimportant”.

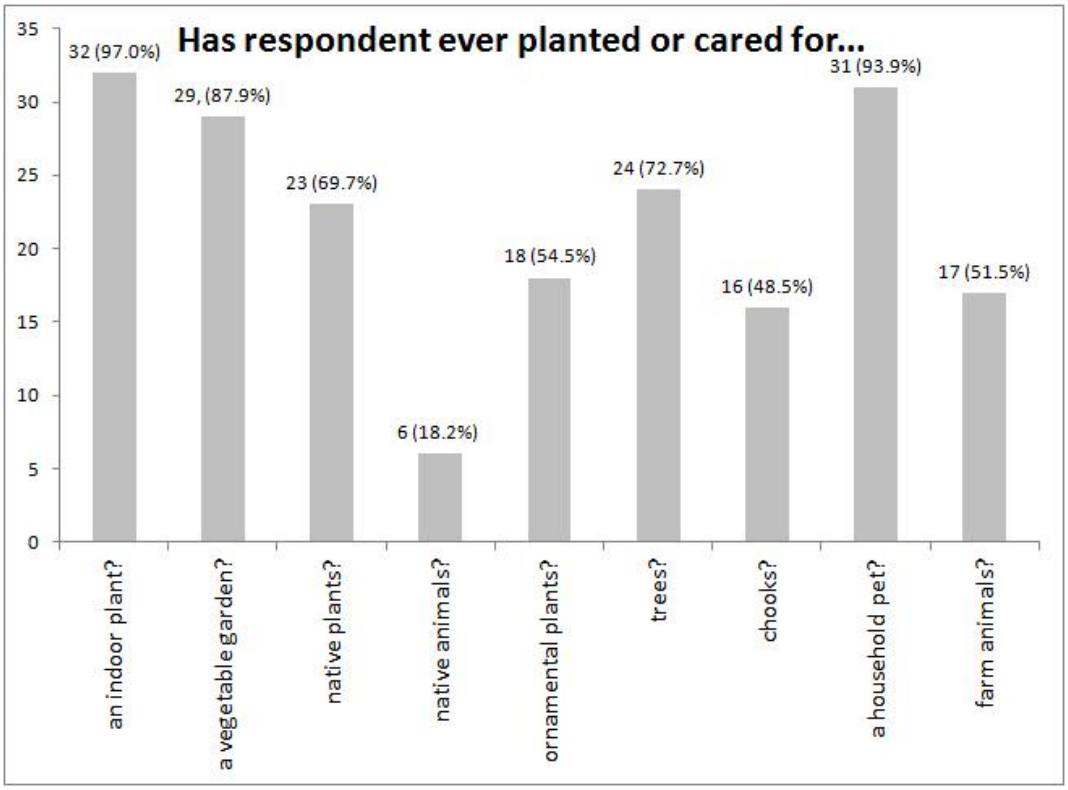

Figure 2. Caring behaviours. Each respondent was asked if they have ever cared for the plant or animal types listed (n=33). Responses indicate total numbers of participants indicating a "yes" for care.

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Taming the Wild: Approaches to Nature in Japanese Early Childhood Education

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The Japanese early childhood curriculum provides ample opportunities for children to interact with nature and to learn about natural phenomena. However, using Kalland (1995) and Martinez's (2008) theories about Japanese constructions of nature, this paper argues that most Japanese early childhood experiences do not constitute direct contact with 'nature in the raw' but rather present a tamed, managed version of nature's reality. Drawing on Japanese perceptions of nature, which contrast with the Cartesian world view attributed to the West, the natural environment is revealed as something to be venerated but also the object of revulsion through its potential to harbour pollution. Based on ethnographic fieldwork, this paper argues that Japanese early childhood education reflects Kalland and Martinez's claims that nature in its pure form is not revered, but needs to be tamed and managed through rituals to become palatable.

Keywords: early childhood curriculum, natural environments, perceptions of nature

The Japanese early childhood curriculum emphasizes children becoming aware of their environment through outdoor experiences, contact with flora and fauna, and the use of songs and activities linked to the changing seasons. These experiences are designed to provide children with an opportunity to interact with nature and to learn about natural phenomena. However, the kinds of events and rituals *in*, *for* and *about* the natural environment (Palmer and Neale, 1994) take place within a shared framework constructed by the state and kindergarten teachers. This framework is not an overt feature of the Japanese early childhood curriculum, but one that has instead been constructed through implicit, shared understandings of how children should experience nature. Using Kalland

(1995) and Martinez's (2008) theories about Japanese constructions of nature, this paper argues that most Japanese early childhood experiences and rituals do not constitute direct contact with 'nature in the raw' but rather present a tamed, managed version of nature's reality.

The paper begins with a brief explanation of Japanese perceptions of nature, which contrast with the Cartesian world view attributed to the West (White, 1967). In the West, it is argued that the origins of interactions with nature remain rooted in Judaeo-Christian belief systems which emphasise humanity's domination of nature (Klein, 2000) in contrast to Japan where there is a more holistic approach. In reality, disregard for the environment and the ensuing environmental problems are just as prevalent in Japan as in the West (Kalland, 2002). This apparent contradiction is explained by scholars who argue that nature in its pure form is not revered in Japan, but needs to be tamed and managed through rituals to become palatable (Kalland, 1995; Martinez, 2008). The natural environment is at once something to be venerated but also the object of revulsion through its potential to harbour pollution (Ohnuki-Tierney, 1984).

Based on fieldwork carried out at Oka Kindergarten[i] in Hokkaido, Japan, the dichotomies that prevail in the literature become apparent in the reality of the kindergarten space. Children attending the kindergarten are free to explore the unfenced boundaries of the playground which is surrounded by trees, flowers and a myriad of insects from spring to autumn. These activities are sanctioned as appropriate because they embody the ideology of *furusato* (home village) which idealises childhood as an idyllic time spent gathering flowers, catching insects and rolling on the grass (Knight, 2002; Robertson, 1988). Particularly in urban areas, outdoor play has come to be seen as one way to minimise the sanitised effects of modern lifestyles. In reality, however, contact with nature is always mediated and structured according to perceptions of the raw/wild and the tamed/managed. This idea is explored through a discussion of kindergarten rituals observed during fieldwork.

METHODOLOGY

Data is drawn from ethnographic research carried out at Oka Kindergarten in rural Hokkaido, Japan (Burke, 2013). Ethnographic researchers conduct fieldwork within the culture(s) they are studying, collect data on the basis of participation and observation, and then use theory to unpack this data (Ben-Ari & Van Bremen, 2005). The study draws on Joseph Tobin's *Preschool in three cultures* (PS3C) methodology (Tobin, Wu & Davidson, 1989; Tobin, Hseuh & Karasawa, 2009) which utilised film to present comparative views of early childhood education through the eyes of teachers.[ii] Fieldwork consisted of one month spent filming and observing at Oka Kindergarten, and concentrated on the experiences of a class of four year old children. To address issues of typicality, the video was shown to focus

groups of early childhood teachers and academics.[iii] All of these discussions were filmed and formed the basis for analysis, using a "classic analysis strategy" (Krueger & Casey, 2009, p.118).

It is important to note that approaches to nature in Japanese early childhood education was not the specific focus of the original research. The data for this paper has been drawn from my comparative study of implicit cultural practice in early childhood education in New Zealand and Japan (Burke, 2013).[iv] The PS3C method uses film to uncover implicit cultural assumptions. In the case of my doctoral study, the empirical data was generated from hours of video, discussions, analysis and feedback from the participants in the two field sites and during the focus group sessions. This process resulted in very rich data resulting in 'the body' becoming the primary locus for my analysis. However, there were many interesting issues which also emerged but were cut due to space constraints in the main study. One of these was differing Japanese and New Zealand responses to the way nature was approached in each context. For this article, I have concentrated on Japan, as I believe there is very little in the literature which discusses environmental education in Japanese early childhood education. As the original study was conducted in the field of anthropology, I have drawn on the theories of anthropologists Kalland (1995) and Martinez (2008) to provide a useful framework to unpack the data.

The analysis combines both the month of observation, and that of the teachers' discussions. I had previously spent six years living in Japan, and three of those years teaching at Oka Kindergarten where fieldwork took place. My long-term relationship with Oka staff was a strong factor in choosing a field site, as a mutual level of trust was essential. In Japan, personal connections and introductions are vital to conducting research (Bestor et al, 2003). It was also important that the centre be considered as of good quality, and regarded as relatively representative of kindergartens across Japan. My three children were also born in Japan, and attended kindergarten there. This 'cultural capital' was a valuable asset to the project and to my understanding of the data (Bourdieu, 1983).

Japanese perceptions of nature

Unlike dominant Western views of nature, which draw on a Judaeo-Christian belief system emphasising dualism (Klein, 2000; White, 1967), the Japanese do not make the distinction between man and nature, but see the two realms as intrinsically connected (Lebra & Lebra, 1986, p.4). The Japanese sense of nature has been presented as a dichotomy by scholars as Japanese people identify themselves as being very sensitive to nature yet Japan is is notable for its environmental problems both within the country and outside it (Kalland, 1995; Martinez, 2008). Kalland (1995) claims that the widespread view of Japanese society as nature-loving is a misconception derived from Japanese admiration for nature expressed through the arts and literature. It has been argued that the main difference between

European and Japanese notions of nature lie in the terms which describe it. In Japanese the word for nature (*shizen)* contains the character for "self" which contrasts with European ideas which view nature as something to be conquered at the hands of humans. These ideas are linked to Cartesian concepts of the "mind/body dualism and Platonic notions of nature as something outside that needs to be understood" (Martinez, 2008, p.186).

Martinez (2008) claims that while the Japanese do not appear to share the European predilection to dominate nature, they show a desire to trim, shape and work on nature. This view is echoed by Kalland (1995) who suggests that the Japanese seek to control and conquer nature by altering its natural state to a more controlled, tamed form. He draws on Buruma (1985) to argue that many Japanese appear repulsed by 'nature in the raw' (*nama no shizen*) and it is only by a process of taming (*narasu*) or idealisation that nature can become acceptable or admired. This process can take the form of paintings, poems, sculptures, novels, or even manicured gardens. "Nature can be both raw and cooked, wild and tamed. Torn by destructive and creative forms, nature oscillates between its raw and cooked forms, and in its cooked form nature and culture merge. It is in this latter state, as idealized nature, that nature is loved by most Japanese" (Kalland, 1995, p.246). The classic example of this idea is the bonsai.

Even the Japanese landscape has been metaphorically tamed through a hierarchical ranking of the nation's most beautiful places. Kalland suggests that their beauty stems less from actual reality than from classification as such by tourist boards or the admiration of a famous artist. In contrast to the environmental protection stance taken by many other countries, Japan's designated beauty spots are peppered with hotels, highways and vending machines so that the maximum number of people can become "one with nature" (Kalland, 1995, p.252). Martinez (2008) argues that Japanese experiences of and attitudes to nature are no longer linked to class, as in the past, but split along the lines of urban versus rural dwellers. Urban dwellers experiences of nature are increasingly typified by limited visits to the 'real' Japan and the people who inhabit that endangered rural space.

Constructing *furusato* within nature

These ideas have been explored by Knight (2002) who has evoked notions of *furusato* (home village or native place) in discussions about nature. Knight suggests that in modern, urban Japan the *furusato* can be found in the rural village set in green fields edged by vertiginous mountains. Within this setting the activities of childhood are remembered as taking place in the forest or the hills: gathering herbs, catching insects, playing in the river, and running in the long grass. Cave (2007) notes that the educational reforms implemented in Japanese schools in 2002 seemed to come from this place of imagined nostalgia for a Japan that was rich in opportunities to engage with the natural world. Children themselves

are often linked to nature in Japanese literature with metaphors of plant cultivation used for childrearing (Chen, 1996).

Knight (2002) draws on the writings of Japanese scholars Tanaka (1996) and Ogawa (1993) who express concern that for Japanese children these experiences are not only much rarer, natural spaces are increasingly regarded as dirty or dangerous by modern mothers. Villagers interviewed by Knight felt that without time to enjoy unrestricted play in the forests or mountains, children will grow up without a tangible link to their local area, in other words, with no love for their *furusato*. In an attempt to overcome this problem rural tourism has been promoted extensively in urban areas. While in some cases this has resulted in swathes of natural land being saved in the belief that the forest is the "children's playground" (Knight, 2002, p.280) in other areas rapid development has occurred to accommodate swelling numbers of domestic tourists in the countryside.

Japanese cosmology does not differentiate between deity, man and beast, yet there is a clear distinction between inside (*uchi)* and outside *(soto*) (Lebra, 2004). Linked by a complex set of mutual obligations, gifts and services, the inside world of social interactions is familiar and comforting to its members. The outside world, in contrast, is threatening and unpredictable. This is true of one's social world and of nature. In a country which regularly faces natural disasters such as typhoons, earthquakes and floods, the Japanese fear nature as they simultaneously try to tame it (Kalland, 1995).

Nature itself is not seen as specifically dirty but care must be taken to avoid contamination through contact with an omnipresent outside (*soto*) where germs are located (Ohnuki-Tierney, 1984). This fear of the outside is fostered from childhood as a significant contrast to "the safety and indulgence of the inside" (Hendry, 1986, p.113). As children's lives become more sheltered and sanitised, nature remains the last frontier to be explored, yet the potential risks are increasingly under scrutiny, both within the early childhood context and in the world beyond.

The risks and pleasures of engaging with nature

There has been a notable increase in the literature concerning children's lack of opportunities to experience and explore the natural environment in comparison to previous generations (Freeman and Tranter, 2011; Louv, 2005; Ouvry 2000). Children have gone from playing unsupervised in outdoor environments to being the ultimate consumers of controlled, sanitised entertainment (Stearns, 2003). Freeman and Tranter (2011, p.163) call the loss of positive natural experiences "environmental amnesia", reflecting children's contact with increasingly degraded outdoor environments which eventually become the norm. Nature is being positioned more and more as something to be feared and avoided (Louv, 2005). In Japan, Klein (2000) has questioned how the invention of fictive animals such

as the *tamagochi* diminishes opportunities for children to engage with the natural world on its own terms through the experience of birth, life and death. As Klein points out even if children neglect to feed the *tamagochi* it can be reborn after death. These popular children's toys represent a distortion of the natural world by technology.

The scholarly discussions about children's interactions with the natural environment are reflected in the approaches taken by teachers at Oka Kindergarten who expressed their desire to have nature (*shizen*) prominent in children's early childhood experience. At the same time, the need to minimise risk and protect children from the less pleasant aspects of nature was a strong theme.

The concept of boundaries is a useful means of illustrating the contrasting approaches to nature, risk and children's freedom. In the Japanese early childhood context, access to nature, and an understanding of its importance, is viewed as an integral part of early childhood education. The category of 'environment' forms one of the five key components of the Japanese kindergarten curriculum and goals for children include becoming acquainted with the environment by coming into contact with nature in their daily lives, as well as observing and handling natural phenomena such as plants and animals. More specifically the curriculum urges children to notice the size, beauty and wonder of nature, to notice the impact of the seasons on people's lives and to develop feelings of respect towards natural creatures (Ministry of Education, Science, Sports & Culture, 2001).

Unlike Western cultures, such as New Zealand, where enclosed fences and spring-loaded gates are realities of the modern centre, at Oka Kindergarten large parts of the playground remain unfenced.[v] The Oka principal believes that it is important for children to able to meander freely to the edge of the woods beside the centre to pick flowers or catch dragonflies. In a reflection of *furusato* ideology (Knight, 2002), there are no structural boundaries in place to either restrain or contain children. With a roll of over 150 children and eight teachers there are plenty of opportunities for children to wander off during the free play time but this is rarely a problem due to peer monitoring. Strong social controls remain in place to minimise risk and children are given a great deal responsibility for managing their own safety (Walsh, 2002).

Outdoor activities that may not be condoned in Western early childhood contexts are a surprising feature for foreign visitors. American educationalist Daniel Walsh (2004) has described children at a Japanese kindergarten climbing a tree so tall that it made him feel nervous. The tree was located in an area that the teachers rarely visited and it appeared that they hadn't noticed what was going on. In fact, the tree climbing had been discussed at length but it was decided that the teachers would neither intervene nor supervise the area in order to encourage the children's independence and vigilance when climbing. The teachers also reasoned that the tree climbing afforded a good opportunity for the older

children to take responsibility for the younger children in terms of boundaries and safety. For Japanese children boundaries relating to the natural environment and risk seem less likely to be concerned with issues of supervision or prevention of accidents, but more often connected to concepts of pollution and the body. Kindergarten rituals are carefully constructed, so that the less desirable aspects of nature are minimised or eliminated, as the following section explains.

The rituals of nature

As part of the national curriculum, kindergarten children learn about the life cycle of various plants and animals. Instruction usually takes the form of learning relevant songs, reading books together and a practical opportunity to grow a vegetable or fruit, or observe an evolving insect. In the case of Oka Kindergarten, children are able to take part in planting and harvesting potatoes at the kindergarten plot located a short walk from the centre. This event is clearly marked on the teaching calendar written at the beginning of the year. The potato planting (*imoue*) takes place in late May when the frozen Hokkaido ground has thawed sufficiently for the bus driver to be able to hoe the soil into rich clods and harvest (*imohari*) is carried out at the end of August before the weather begins to cool again. For this exercise the children are instructed to come prepared with a set of cotton gloves, gumboots, smocks to cover their clothing, a trowel and their class caps.

Suitably attired from head to toe, the children set off to the potato plot in their class lines where each one gets to drop a seed into the dirt, cover it with their trowel and then move off so their classmate can do the same. Once all the children have finished and returned to their classes the bus driver rakes over the ground and ensures all the seeds are covered before giving the plot a good watering. The harvest follows a similar pattern and when the children return to their classrooms they are served up a steaming bowl of potato and pork stew (*nikujaga*) from potatoes that have been purchased earlier from the supermarket.[vi] Each child is then given a handful of the harvested potatoes to take home in a plastic bag.

The potato planting and harvest are events that are both greatly anticipated and enjoyed by the children and teachers at the kindergarten. Oka Kindergarten teachers explain that these practices are useful ways to get children connected with nature and to appreciate where their food comes from. Throughout it all, however, the children are protected from physically coming into contact with the dirt through the barriers provided by the cotton gloves on their hands, the gumboots on their feet and the smocks over their clothing.

Figure 1. Children at an urban Japanese kindergarten plant seedlings in the vegetable plot.

Ohnuki-Tierney (1984) argues that Japanese notions of germs (*baikin*) and hygiene have less to do with actual risks to one's health but rather are cultural concepts located within a framework of pollution and purity. While washing may exist in most cultures, the Japanese are unusual in their emphasis on cleansing certain body parts, such as the hands and feet, as they are where the body comes into contact with the outside. Regular times for washing one's hands are slotted into the kindergarten day, yet even after cleansing the hands are still seen as vulnerable to dirt (Ohnuki-Tierney, 1984).

As Hendry (1986) has argued, a fear of the outside (*soto*) is cultivated in children from a young age, as a contrast to the sanctuary of the inside world (*uchi*). However, the notion that the outside equates with dirt and fear has been rejected by some radical sectors of Japanese society such as supporters of the 'back-to-nature' movement studied by Knight (1997). Influenced by the Buddhist concept of nothingness (*mu*) these 'natural farmers' reject almost all treatment of the field such as fertiliser, weeding or ploughing. Some of these families have withdrawn their children from school in the belief that the education system instills a certain way of thinking which separates the young from nature. These parents claim that children take a natural delight in playing in areas such as the paddy field and the forest but through the school system they are taught to see such places as dirty (*kitanai*) and frightening (*kowai*).

They believe these negative views of nature carry through to adulthood and account for why families no longer work and play together in places like the paddy field. Instead, modern children are to be found playing 'safely' inside with their electronic companions.

This sense of vulnerability is not limited to engaging with the outside world (*soto*) itself, but extends to the flora, fauna and creatures within it. As the following section discusses, cultural constructions of nature define which creatures are benign and those which may represent a threat.

Constructing fauna in the playground

As the Hokkaido winter is so long and harsh, Oka Kindergarten teachers see it as important that as many assemblies as possible are held out in the fresh air. Once the chill winds of autumn begin these gatherings are once again conducted inside the kindergarten hall. At each assembly a short talk is given by staff to draw children's attention to notices or upcoming events, and during the warmer months discussions about insects regularly feature. Some insects such as the dragonfly (*tombo*) symbolise the welcome arrival of summer (Laurent, 2000), but others like the wasp (*suzumebachi*) represent a tangible threat to children's safety (Parry, 2005). The curriculum encourages kindergarten children to acknowledge "the importance of life, appreciating and respecting it through experiences of becoming familiar with surrounding animals and plants" (Ministry of Education Science Sports Culture and Technology, 2008). Yet, at Oka Kindergarten, it was not uncommon to see adult female teachers shriek and go pale in front of a class of preschoolers just because a moth had flown into the room. Children are warned to not to touch caterpillars, but the capture of a stag beetle is an occasion for celebration.

The ways in which fauna are designated and defined varies across cultures (Raffles, 2011). Using the insect as a case study can show how children's interactions with natural creatures in the early childhood setting can reveal aspects of a culture's view of nature (Edwards, Moore & Cutter-Mackenzie, 2012). More specifically, the way in which insects are classified and approached at Oka Kindergarten reflects a clear preference for those perceived as 'tamed' and a rejection of more 'wild' species (Martinez, 2008).

Laurent (1995) has suggested that the importance of connections between culture, people and their direct environment is often overlooked. His study focussed on the significance of *mushi* to Japanese culture. While *mushi* might be initially dismissed as a zoological category such as 'insects' in English, Laurent argues that in a Japanese context *mushi* constitutes a much wider group to become an ethno-category which he defines as "a category of thinking bound to a specific culture or peculiar traits of a given culture" (Laurent, 1995, p.62). Laurent's research found that concepts of *mushi* differed according to age and gender with young men playing with *mushi* and viewing them essentially as insects; older men having a broader, traditional view and knowledge of *mushi* and women showing little interest. He notes that this gender divide seems to occur from childhood when boys are encouraged to play with *mushi* while girls are kept inside away from such dirty creatures. In rural areas feminine fears of *mushi* are seen in a positive light and Laurent recounts stories of panic in

women encountering butterflies or worms. However, the type of *mushi* affects Japanese reactions to it as Japanese distinguish between degrees of *mushi*-ness.

Laurent's ideas resonate with Kalland's (1995) argument that the Japanese prefer their nature tamed and classified. Laurent found that creatures such as the firefly (*hotaru*) and the silkworm (*kaiko*) are beloved in Japanese society. They feature in literature, songs, proverbs and legends and they are also viewed, bred and touched. When asked if the firefly and the silkworm were *mushi*, participants were hesitant to classify them as such but finally agreed with the adjunct that these creatures were more civilised or cultured than other *mushi*. Laurent (1995, p.68) notes that "the criteria seem to be a matter of rusticity and robustness as opposed to culture and refinement. The wild species are bigger, darker, and stronger, connoting to Japanese *stranger, wilder*". The type of movement used by *mushi* can also be linked to fear. Sudden and uncontrollable movements such as those exhibited by moths and butterflies are seen as particularly frightening. Unlike the positive images evoked by the firefly and silkworm, many *mushi* are seen negatively by Japanese people as epitomised by the saying "to hate something as much as a hairy caterpillar" (*kemushi no yo ni kirai*).

Studies of anxiety in Japanese and German children predicted that Japanese child-rearing practices would make them more anxious about separation from parents or social phobias than the German sample but in fact the results showed this not to be the case. Japanese children scored most highly on physical injury fears which included fear of insects, spiders, the dark and dogs (Essau et al, 2004). Another cross-cultural study found the Japanese participants to be much more afraid of spiders than those in the five other countries examined (Davey et al, 1998). Researchers in these cases were unable to ascertain the root cause of these fears.

The Japanese early childhood curriculum aims to provide opportunities for children to make sense of their natural environment. However, cultural beliefs about insects can determine the level and quality of the interaction. While appealing insects such as the dragonfly (*tombo*) and ant (*ari*) are often the subject of observation and class project work at Oka Kindergarten, other less attractive creatures like the caterpillar (*kemushi*) rarely feature. Art projects are regularly accompanied by moral tales which personify the insects through descriptions of their commendable or corrupt actions. Macanbelli (2002) argues that few insects are represented in Japanese folk tales, with the exception of the dragonfly which is associated with wealth. However, Mayer (1981) found that other insects such as the ant, the bee, the fly and the louse also feature. Within the kindergarten classroom, these insects are frequently revered for their work ethic.

Another example of an insect rooted in Japanese symbolic meaning is the horned beetle (*kabuto mushi*) whose startling appearance is considered ugly by Western standards. Yet,

this insect is very popular as a children's pet in Japan. The *kabuto* of the insect's name means samurai helmet and this linguistic link conjures notions of bravery and honour. As a result, the insect has come to symbolise good fortune and wealth (Macanbelli, 2002). While children once used their abilities to catch beetles in the wild, *kabuto mushi* are now more often purchased from pet stores along with plastic cases, bedding, food and even humidifiers to prevent dehydration. During the summer months at Oka Kindergarten, at least one class would have a plastic encased beetle on display, the ultimate symbol of nature tamed for commodification by children and adults (Kalland, 1995; Martinez, 2008).

Re-presenting nature in the classroom

As well as encouraging children to become aware of their natural environment through contact with flora and fauna, the Japanese kindergarten curriculum emphasises the use of songs and activities linked to the changing seasons (Yamamoto, 2011). Japan's four seasons are widely extolled throughout the country and remain a favourite subject for artists, writers and poets (Asquith & Kalland, 1997). Rituals such as the cherry blossom viewing picnics held in the spring (*hanami*) and trips to see the changing colours of the autumn leaves (*kōyō)* are regular, constant events in the lives of most Japanese. Letters written between friends and acquaintances in Japan usually begin with a reference to the weather or the season.

In recognition of the important part the environment plays in their daily lives, there are also many songs which have been written to celebrate the joys of nature. In autumn, children sing of the *donguri* (acorn) while during winter and summer references are made to snowmen (*yukidaruma*) and sunflowers (*himawari*). One of the most well-known songs children learn is *Sakura, Sakura* (Cherry blossom) which is a simple tune able to be mastered even by those who don't speak Japanese. It is taught to children during the month of March, when spring is said to have arrived in Japan. The fact that there is often still snow on the ground in the northern island of Hokkaido does not prevent it being sung by kindergarten children there along with thousands of other children across the country. Activities at Japanese kindergartens are shaped by teachers' use of standardised texts throughout the country, resulting in 'appropriate' seasonal activities being dictated by the climate of populous central Japan (Ben-Ari, 2002). Nature is therefore repositioned, or tamed, to fit into a suitable teaching schedule that may bear little relevance to what children at Oka Kindergarten are experiencing outside their window.

Even the names of the classes at Oka Kindergarten are drawn from nature with the tulip, dandelion, chrysanthemum, morning glory, cherry blossom and lily all represented. Made by the teachers, artfully arranged cardboard representations of each flower stand at the entranceway to each class for easy recognition. At Oka Kindergarten, children are expected to produce pastel drawings and paintings of iconic symbols of nature at the appropriate

time of the year. *Origami* (paper folding) also features strongly on the schedule with the classroom walls adorned with paper cherry blossoms in spring and strawberries in summer. Arts and crafts projects also reflect the seasons but it is notable that few of them actually incorporate raw natural resources. Missing from the Japanese context are the imperfect creations made from foraged sticks, leaves or pebbles that are the mainstay of New Zealand centres (Duhn, Bachmann & Harris, 2010; Ritchie, 2010).

It is in the paper flowers and painted landscapes that Kalland (1995) and Martinez's (2008) claims of a Japanese preference for a tamed version of nature can be seen most clearly. While the changing seasons of nature may be celebrated in Japan, actual paraphernalia from nature is not widely used in the kindergarten classroom. Most of the resources used at Oka Kindergarten are manmade and quite often plastic. Decorations on the wall are similarly constructed out of bright, new pieces of cardboard that the teachers have cut, assembled and glued into attractive characters or motifs.

Figure 2. The wall of this Japanese centre is decorated with references to the season: cosmos and carnation flowers overseen by swallows.

In order to make seasonal flowers or fruits which celebrate the bounty of nature, children at Oka Kindergarten are given a new sheet of cardboard to draw on or fresh squares of coloured origami paper to fold into shape. The stationery area of the kindergarten contains large shelving units which house a huge array of paper of different textures, colours and

sizes. This is supplemented by supplies of cardboard, foil, pipe cleaners, crayons, cotton wool, glitter and ribbons. All of this equipment is new and teachers can select from the stationery area any time they require materials for children's art sessions or to make decorations for their classrooms.

Where are the resources foraged from nature?

While using natural resources may seem patently obvious in early childhood contexts elsewhere (Prince, 2010; White et al., 2008), both from an ideological and economic point of view, they do not feature strongly at Oka Kindergarten. The area of Hokkaido where the kindergarten is situated is famous as a timber producing area and presumably there are a large number of off cuts and wood products that could be sourced for free. However, while Oka promotes itself as using natural materials, the preference is clearly for new products rather than those donated from the local community or foraged from the environment. The kindergarten is notable for its beautifully made wooden toys, large wooden blocks and even bins of polished wooden balls to play in.

Drawing on the arguments of Kalland (1995) and Martinez (2008), it would appear that recycled materials do not have the same pure, clean, unpolluted feel to them that many Japanese prefer. The possibility of natural resources being interpreted as either dirty or a sign of poverty was brought up by an Oka Kindergarten teacher who had seen the use of recycled resources in an overseas centre. Her initial reaction was to assume that the kindergarten must be terribly under-resourced if the children had to play with rubbish instead of appropriate materials.

Japan has a strong tradition of recycling, and residents are required to carefully sort household rubbish for collection. However, as Kirby (2011) has described, Japanese beliefs regarding purity and pollution dictate how waste is classified, and how objects may come to be seen as hygienic or dirty. While carefully cleaned food trays, jars and tins are deemed suitable for use at Oka Kindergarten, objects foraged directly from nature are not. If the outside world (*soto*) is inherently seen as polluting (Hendry, 1986), then it is possible that objects taken from this sphere also retain some of their polluting qualities, rendering them unsuitable for handling by children. One of the first words children learn is *bacchi* or dirty which is taught by adults repeatedly identifying objects that are unclean and therefore should not be touched (Ohnuki-Tierney, 1984).

The concept of polluted objects and spaces become so ingrained by early childhood, that children sometimes exploit this fear of dirt by starting to sit down on a dirty surface so adults will carry them. The belief that the outdoors is a dirty space is also reflected in objects that mothers are expected to purchase as part of their children's essential kindergarten equipment. For example, every child is required to own a colourful square of

plastic sheeting that compactly folds away. This *re-ja sheeto* (leisure sheet) is used to spread over the ground and sit upon when the children go on trips to the local park or gardens. Just as nature may be most beloved in a sculpted bonsai (Martinez, 2008), children at Oka Kindergarten learn to enjoy nature mediated through protective equipment and clothing, and during ritualised excursions into 'the wild'.

Figure 3. A wide range of commercially produced wooden resources can be seen at this early childhood centre in Hokkaido.

Nature as an antidote to modern lifestyles

From the above examples, it appears that nature seems to be at its most beautiful when re-presented at a distance in the form of art, songs and managed rituals at Oka Kindergarten. However, teachers are aware that children today are living in a world that bears little resemblance to the *furusato* ideal of natural bliss. To mitigate modern lifestyles teachers create opportunities for children to spend time outside, *in* the environment (Palmer and Neal, 1994).

At Oka Kindergarten, children are encouraged to spend at least some part of the day outside regardless of the weather. In the middle of the harsh Hokkaido winter this translates to weeks of sub-zero temperatures but children simply don the appropriate clothing and adapt their play to the conditions. Memories of kindergarten in northern Japan are peppered with time spent constructing tunnels and slides out of fresh snow and packed

ice. The notion that children should experience all facets of the environment regardless of the weather can also be seen in the approach of the 'naked kindergartens' where children wear minimal clothing all year round. In an interview in a Japanese newspaper, the principal of one of these kindergartens stated that "the meaning of this is to bring kids closer to nature'' (Naked education: Learning to undress for success, 1990).

These ideas have parallels with Nordic countries that have attempted to mitigate negative changes in children's outdoor play habits. Swedish children head outside to play each day regardless of the conditions claiming "there's no bad weather, only bad clothing" (Lancy, 2008, p.198). In Denmark, Gulløv (2003) has drawn on nostalgia as influencing the creation of so-called 'forest kindergartens'. These centres are very popular with middle class parents who want their children to learn to interact in with nature in a more 'authentic' way than is possible in their urban home environments.[vii] Within the forest kindergarten children spend their time collecting berries, building huts and making small fires to cook on. Gulløv (2003, p.27) suggests that the forest kindergartens have created a new, discrete space for children in the hope that materialism can be "countered by the possibilities offered by nature".

Just as Nordic countries draw on nostalgia to promote outdoor experiences in the early childhood context, activities at Oka Kindergarten reflect a desire to return to a simpler lifestyle that is more in touch with nature. However, these activities are mediated through time, space and bodily wrappings. Appropriate clothing must be donned for interacting with the outdoors, whether it is ski-wear in winter, or a swimsuit during water play. Children and staff are expected to 'unwrap' the layers surrounding the body before engaging in vigorous play with mud, dirt or water. The body is then be cleaned and 'rewrapped' before returning to the internal space of the classroom (Hendry, 1993). The time assigned for free play is strictly adhered to, and children must return to the classroom on the sound of a bell. While the grounds may not be fenced, children know not to travel across the unseen boundaries delineating between the safety of the kindergarten and the unpredictable outside world. These experiences bear little resemblance to *furusato* ideology which positions children as wandering freely outdoors, collecting insects and flowers, soil trailing from hands and feet (Robertson, 1998).

Reflecting on nature

This paper has argued that a desire to 'tame the wild' can be seen in the rituals and structures of the Japanese kindergarten (Kalland, 1995; Martinez, 2008). Kalland and Asquith (1997) have discussed the enduring myth of the Japanese love of nature which contends that the Japanese have managed to live harmoniously with nature in contrast to Westerners alleged desire to conquer her. An ancient appreciation for nature's aesthetic beauty combined with religious beliefs that natural phenomena were sentient beings has led to nature being widely revered in Japan. Images of nature remain ubiquitously linked to

modern advertisements for Japanese events or products (Moon, 1997; Moeran & Skov, 1997). Kalland and Asquith (1997) argue that Japanese views are not only complex, they are constantly evolving and context specific. Western debates suggest that nature exists in two forms: wild and untamed or domesticated and aesthetic. While the former is often despised by Japanese, the latter form of nature is linked with culture and generally adored by Japanese. The view that nature is something to be controlled, sanitised or even feared is not limited to Japan (Louv, 2005). Japanese efforts to try to perfect and aesthetically objectify nature correspond with Judeo-Christian world views which seek to control the environment.

The complexity of Japanese approaches to nature may offer an explanation for the contradictory practices and rituals observed at Oka Kindergarten. While Oka teachers claim that they are close to nature, in reality many of their practices reflect a risk discourse which sees them managing nature to make it less threatening, and more palatable. Children must wear gloves to harvest potatoes, and spread plastic sheets upon the ground, lest they come into contact with raw soil. Flora is recreated in crisp cardboard, and fauna that has been classified as 'more cultured' is favoured for class work. While teachers understand children's need for experiences in nature, these experiences are shaped within the ideology of *furusato* (Robertson, 1998). An activity such as tree climbing, which is deemed too risky in many early childhood centres worldwide (Louv, 2005) is supported as it links to beliefs about children's bodies needing physical challenge (Walsh, 2004). Rituals and activities that fall outside Japanese definitions of tamed nature are less welcome.

While a structured curriculum at the Oka Kindergarten means that children's activities may pay close attention to the rhythm of the seasons, the products of these sessions are artificial and stylised images of nature. This approach serves to detach, isolate and objectify raw nature and to deny the intrinsic value of conserving and protecting nature of and for itself. The children are not really engaging proactively to protect and enhance the natural world around them. There is little sign of fostering a truly sustainable conservation ethic that would lie in opposition to the dominant values of consumerism and materialism that have become so influential in Japan, and on a global scale. Instead children's actions and practices mirror the curriculum guidelines which focus more on involvement *about* the environment (Palmer & Neal, 1994). Although teachers and children are trying to have more meaningful interactions with the environment, it is still a long way from the nature-centred approach that can be seen in Nordic countries (Gulløv, 2003; Duncan, 2006). The way in which Japanese early childhood teachers and children engage with nature reflects their cultural values. Despite claiming to respect and revere the environment, a desire to dominate and control nature can be seen in the choices made about practice and policy at Oka Kindergarten. All of the examples discussed in this paper represent a desire for nature to be experienced not in her raw, untamed form, but as a managed, tamed version of herself, as described by Kalland (1995) and Martinez (2008).

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[i] A fictitious name has been given for the kindergarten.

[ii] For more detail about how Tobin et al.'s methodology was used for this study, see Burke (2013).

[iii] In Japan, focus group sessions were held in Tokyo, Saitama, Osaka, Eniwa and three in Kutchan. Two sessions were conducted in Christchurch with groups from Hiroshima and Nara. The groups were made up of teachers (practitioners currently working in an ECE setting) and academics (working or teaching in the field of ECE in tertiary institutions).

[iv] Ethics approval was given for this study through the Massey University Ethics Committee in Auckland, New Zealand.

[v] Although it is common to see playgrounds that are not completely fenced in rural Hokkaido, urban centres in other parts of Japan enforce more stringent structural boundaries.

[vi] When I queried them about the use of store bought potatoes, the teachers could see no contradiction between their actions and the lesson on nature. The *nikujaga* potatoes are pre-purchased and prepared as a way of dealing efficiently with the large class numbers, and the teachers reasoned that the children would still get to taste the harvested potatoes at home with their families.

[vii] As Gulløv points out, this aim is somewhat paradoxical as children are encouraged to be self-managing within the kindergarten space yet the very creation of such centres reflect the increasing protection of childhood.

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Early Childhood Educators' Preferences and Perceptions Regarding Outdoor Settings as Learning Environments

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In the context of encouraging the use of natural outdoor settings for educational experiences with young children, survey research using photographs of outdoor settings was conducted to explore inservice early childhood educators' preferences and perceptions regarding outdoor settings and the educational opportunities and resource needs they associate with these settings. Results suggest early childhood educators perceive playgrounds as the most conducive outdoor setting for achieving educational outcomes, specifically for unstructured opportunities for play. Results are compared with preservice early childhood educators' responses from prior research, as well as with research-based characteristics of natural settings conducive to quality play. Implications for those who provide preservice preparation/in-service professional development are discussed, as are implications for environmental educators and park/land managers for supporting educators in the use of natural outdoor settings with young children.

Keywords: early childhood, landscape preferences, natural settings, affordances

According to the *Early Childhood Environmental Education Programs: Guidelines for Excellence* (2010), developed by the North American Association for Environmental Education through their National Project for Excellence in Environmental Education, frequent opportunities to explore, observe, and play in natural environments is a cornerstone of excellence in early childhood environmental education (NAAEE, 2010).

Nature experiences in the form of child-directed play and exploration are considered to be one form of developmentally appropriate environmental education for young children. Play and exploration in nature are well aligned with early childhood pedagogy (Wilson, 2012). Play is a fundamental avenue for early childhood learning (Elliot, 2010) and well acknowledged within early childhood education as the primary way for meeting children's development requirements (Armstrong, 2006). Quality play requires access to a diversity of elements and surfaces (Lester & Maudsley, 2006). Natural settings provide diverse ground cover, a variety of spaces, loose parts that can be manipulated by children, and the possibility of 'chance' events' (Noren-Bjorn, 1982). According to Staempfli (2007), "the physical diversity of the natural landscape has a functional impact on children's behavior and play performance because it increases the opportunities for creativity, learning, and development" (p. 237). Thus, natural settings offer the diversity, variety, and open-endedness needed to engage, inspire, and challenge young children, thereby enhancing the opportunity for learning and developing through play (Elliott, 2010).

Natural outdoor settings, however, have been underutilized in early childhood education (Miller, Tichota, &White, 2009). Skamp and Bergmann's (2001) research on 'learnscapes,' Simmons (1993, 1994) research, and research by Ernst and Tornabene (2012) suggest selective use of outdoor educational settings accompanied by multifaceted motivations and barriers. Simmons (1998) suggests the need to understand how teachers perceive natural settings to better guide professional development efforts to help teachers develop the necessary skills, knowledge, and attitudes for using these settings and to overcome associated barriers. The following study builds on Ernst and Tornabene (2012), which found preservice early childhood educators perceived parks as the most conducive outdoor setting for achieving educational outcomes and an inclination toward using maintained outdoor settings rather than natural outdoor settings. The results of this preservice study were consistent with Simmons (1994), who found elementary teachers more likely to use built settings to teach about nature, but in contrast with Simmons (1993), which indicated a strong preference among teachers for using natural rather than maintained outdoor settings.

In light of the importance of perceived difficulty in using natural settings (Ernst & Tornabene, 2012), it is possible that this inconsistency between the two Simmons' studies reflects a difference between what teachers would like to do and what they perceive as or have found to be feasible. The difference between the preservice early childhood educators' preference for maintained outdoor settings (Ernst & Tornabene, 2012) and the inservice elementary teachers' preference for natural settings (Simmons, 1993) might be explained by differing developmental needs from early childhood to elementary-aged children. It may also be reflective of differing experience levels, as preservice teachers generally have less teaching experience upon which to base their beliefs or preferences. Further, research suggests pre-service teachers beliefs often reflect the way they remember being taught rather than the pedagogical knowledge

learned in their teacher education program (Pajares, 1992), and level of teaching experience is related to how realistic teachers' expectations are (Martin, Yin, & Mayall, 2006). There appears to be support in the literature for differences in preservice and inservice teacher beliefs (for example, self-efficacy beliefs regarding science and math teaching, Wenner, 2001; classroom management beliefs, Rossas & West, 2009; orientations toward content area reading, Konopak, Readence, & Wilson, 2001; etc.). Thus, in light of potential differences in preferences from preservice to inservice educators, it is likely that a study of inserivce early childhood educators' preferences will provide additional insight to guide efforts by teacher educators, environmental educators, and park/land managers to encourage and support the use of natural settings in early childhood education.

LITERATURE REVIEW

The physical environment impacts the learning and development of children, making educational spaces essential elements of any educational approach (Gandini, 1998). Bronfenbrenner (1999) found differences in children's developmental outcomes based on the quality of the physical environment and the proximal processes within those environments. Differences in cognitive, social, and language outcomes between higher quality and lower quality childcare settings have also been noted (National Institute on Child Health and Human Development, 2000). While most of the research on quality environments for young children has investigated differences in quality across indoor settings, there is some research investigating differences in quality across outdoor environments.

Frost (1992) suggests certain types of outdoor environments support children's learning, growth, and development more effectively than others. For example, DeBord, Hestenes, Moore, Cosco, and McGinnis (2005) found lower quality outdoor environments to be associated with more functional or repetitive play and a higher frequency of negative behaviors, while higher quality outdoor environments were related to more constructive play, such as building and hypothesizing. Similarly, Hesteness, Shim, & DeBord (2007) found playgrounds with more natural elements had less repetitive behavior and more constructive play than playgrounds with fewer natural elements. Herrington & Studtmann (1998) studied the effect adding natural materials to outdoor environment; their work suggests an increase in children's spatial-cognitive awareness, physical competence and skills, and socialization, as well as longer durations of fantasy play. Hannon and Brown (2008) found the inclusion of loose parts in the form of natural materials into outdoor play space to increase constructive and dramatic play. Fjortoft (2004) found improved motor fitness, balance, and coordination in young children playing in a natural environment, as compared to young children playing on a more traditional outdoor playground.

Much of the distinction in quality in outdoor environments appears to be related to variation and diversity. As Danks (2010) writes in her book, *Asphalt to Ecosystems:*

Design Ideas for Schoolyard Transformation, "traditional schoolyards are one-dimensional environments, geared almost entirely toward organized games and repetitive, physical play on climbing structures. They are generally the same from day to day, with little variation throughout the year" (p. 7). In contrast, green schoolyards provide a diverse range of activities that "occur in an ever-changing visual landscape that is designed to be continually growing, blooming, and shifting in some way" (Danks, 2010, p. 7). This is consistent with Frost (1992), who argued that the diversity and variation of natural features allow a wider range of learning opportunities not available from other outdoor play space options.

Fjortoft and Sageie (2000) found that a diverse natural landscape "had the qualities to meet the children's needs for a varied and stimulating play environment where the composition and structures of the landscape were conducive to different play functions" (p. 92). In their study, landscape characteristics (vegetation type, vegetation density, slope of topography and roughness of topography) influenced play activities, with children selecting the habitats that afforded play and with seasonal changes in the landscape influencing seasonal play preferences. Like Nicholson (1971), they contend that "the stimulation of inventiveness and creativity, and the possibility of discovery are directly related to the number and the kind of features in the environment" (Fjortoft & Sageie, 2000, p. 94). Further, they state "diversity is also synonymous with an enriched environment, which again stimulates and promotes play and learning" (Fjortoft & Sageie, 2000, p. 94). In 2009, Fjortoft, Kristofferson, and Sageie found the more varied the environment was, the more activities were present.

Noren-Bjorn, in her review of Swedish playgrounds, suggests play spaces should be as full of variety as nature itself, with a diversity of ground cover and surfaces (rocks, stones, sand, grass, water, etc), a variety of secluded and open spaces, the possibility of chance events, and loose parts that can be manipulated. She writes, "in a natural setting in a wood, there are chance events occurring all the time: a bird flies away, a leaf falls, there is a rustling noise. The shape of stems and stumps can suddenly seem to resemble something else and so fire a child's imagination… We have observed that it is often chance occurrences like the formation of a puddle that inspire children in their play. The bumpy or uneven or haphazard appeals to their fantasy and way of thinking" (1982, p. 188). Elliot writes, "Natural shapes, textures and scales are not so predictable" and require concentration as well the integration of both senses and physical skills (2010, p. 64). Thus, in addition to variation and diversity, the environmental characteristics of unstructured and manipulability are important in playspaces (Hart, 1979; Moore, 1986; Nicholson, 1971). Seashores, according to Nicholson (1971) are a good example of a physical environment that has a constantly changing nature, a degree of disorder, a diversity of living and non-living objects, and a range of found components that provide endless possibilities for play, interaction, exploration, discovery and creativity. The open-endedness of natural materials (materials where there isn't a single right way to use them) allow them to be used in many creative ways and in a variety of imaginative play scenarios. Unstructured materials or settings prompt children to think,

"What am I able to do?" rather than "What am I supposed to do?" (Hamarstrom, 2012). The manipulability of natural materials can promote a sense of agency and a sense of place. Children who have the opportunity to shape their own small worlds during childhood will grow up "knowing and feeling they can participate in shaping the big world tomorrow" (Sobel, 1990, p. 12).

Some writers and researchers such as Nabhan and Trimble (1994) and Fjortoft and Sageie (2000) contend that the environmental characteristics of diversity, variation, unstructured, and manipulative are inherent in only natural landscapes. Kirkby (1989) concludes that natural settings have the degree of complexity, plasticity, and manipulability that allows children to experience play behaviors of development significance. Stephens (2007) states that natural environments provide "a richness and level of complexity that is impossible to duplicate" (p. 7). Others, however, such as Weaver (2000) suggest characteristics these can be constructed through careful design. Constructed landscapes can be developed (or "greened") to offer similar opportunities as natural playscapes (Bixler and Floyd, 1997). When access to natural landscapes is lacking or when parents or teachers lack comfort in natural areas, constructed playscapes offer the security and predictability they may need to use outdoor spaces in ways that simulate play in more natural areas. Toward this end, there have been a number of approaches suggested to guide educators and toward creating natural playscapes, green school yards, and outdoor classrooms.

Keeler (2008) in his book, *Natural Playscapes, Creating Outdoor Play Environments for the Soul*, purposefully uses the word "playscape" to connote the idea of a landscape for play, in contrast to what comes to mind with the word "playground." He writes, "the wonderful world of nature provides all the elements that children could possibly ever need in a playscape: sunlight, water, trees, mud, bugs, edible plants, vines, hills, grasslands, snow, rain, and flowers - the list goes on and on" (2008, p. 67). In addition, he recommends taking into consideration a range of play opportunities, including space for wild physical play, quiet areas, secret paths, sand and water construction zones, shady and sunny areas, sound elements, and gardens. In addition, the playscape should be "a microcosm of your community's landscape, to give the children an up close introduction to the world in which they live" (p. 95).

Elliott and Davis (2009) have similar recommendations: a large grassy area where children can run freely; a number of areas with each supporting a different kind of play activity; pathways to explore that are surrounded by interesting vegetation and stepping stones through garden areas; a constantly changing supply of materials and flexible play equipment with an emphasis on natural or recycled items and loose, moveable elements that children can manipulate; plants of differing heights used in creative ways; garden areas for children to grow and collect food; areas for digging; diverse and natural ground surfaces; and special features such as trickle streams or butterfly houses. In essence, play spaces containing elements such as these have the potential to become "a sea of natural sensory stimuli for children" (Davis & Elliott, 2004, p. 5). In addition to

providing opportunities for sensory development, naturalized play spaces can promote sensory integration processes (simultaneous integration of various sensory inputs) that are less likely to be needed on built surfaces and equipment (Sebba, 1991).

Danks (2010) recommends greening a schoolyard to reflect the local ecology, curriculum, play needs, and cultural context of the school and its students. She outlines site design principles such as choosing a site that is highly visible, aiming for multipurpose use of space and resources, defining space through clear boundaries surrounding the space and defining portions within the space, adding place-making features and memorable structures, and using signs to welcome users and label distinctive project features. She also includes ecological principles that result in multifaceted, environmentally-sound spaces and principles to promote creative and well-balanced play options (including moveable parts; opportunities for exploration, adventure and challenge; and open-ended and imaginative play options that appeal to a wide variety of interests). Dyment and Bell (2008) have similar recommendations, noting the importance of providing a diversity of topography, vegetation, and play opportunities. In their work on greening schoolyards, they found this diversity to increase the quality of children's play by providing them with a variety of enjoyable and non-competitive opportunities that meaningfully and tangibly engage them in their environment and allow them to choose activities that suit their physical and social capabilities.

Parsons (2011) provides this set of design guidelines for creating "constructed green playgrounds:" inclusion of a diversity of vegetation; use of natural elements (controlled water elements, sand, rocks, earth, wildlife); integration of manufactured play equipment for physical opportunities for climbing, sliding, swinging, etc; provision of building materials that can be manipulated by children to create new and unique experiences; inclusion of sensory stimulation (changes in textures, colors, smells, and sounds); provision for different types of play (functional play for gross-motor and basic skill development, construction play for creative thought and problem solving, and symbolic play for role-playing and fantasy play); inclusion of a variety of spaces for different ages; and reflection of the surrounding local place, values, and people.

Another perhaps more well-known set of guiding principles that are consistent with Danks (2010) and Parsons (2011) is the set of guiding principles used for creating Nature Explore Classrooms (Dimensions Educational Research Foundation, 2007). These principles are grounded in field-testing and guide educators and families toward spending more time learning with nature, helping them recognize outdoor time as an invaluable part of each day. They recommend dividing the outdoor space into clearly delineated and clearly visible areas for different kinds of activities including an entry feature, an open area for large-motor activities, a climbing/crawling area, a "messy materials" area, a building area, a nature art area, a music and movement area, a garden or pathway through plantings area, a gathering area, and a storage area. They suggest giving each area a simple name and identifying each area with a sign or other

visual clue. They further recommend using a variety of natural materials, and choosing elements for durability and low maintenance. In addition, they emphasize personalizing the area with regional materials and ideas from children and staff.

An important concept relating to utilizing natural spaces and/or naturalizing play spaces is 'affordance.' Affordances, prominently discussed in research regarding the relationships between humans and their environments, is the range of functions that environmental objects can provide to an individual (Fjortoft, 2004). Kytta (2002) states, "Affordances include properties from both the environment and the action individual. Affordances are always unique and different for each individual and each specific group of people" (p. 109). Or as described by Fjortoft, people assess environmental properties in relation to themselves, not in relation to an objective standard.

Thus, when early childhood educators think about outdoor settings, they likely assess the appropriateness of a particular setting in relation to their perceptions, preferences, or beliefs as educators, and likely not in relation to the guidance in the literature as to what qualities of an outdoor setting optimize play and learning potential. For example, because outdoor play in early childhood programs is often given little consideration, a "strong practice prevails in education that the outdoor setting requires less teacher attention than the indoor setting" (Renick, 2009, p. 5). Consequently, rather than selecting an outdoor setting based on characteristics such as variation and diversity or ability to manipulate loose parts, a teacher, for example, may select a setting based on which setting affords children the opportunity to run off excess energy in a safe manner. Davies (1996) found teachers tended to provide outdoor opportunities for play on equipment designed for physical activity, but less than half of the teachers studied mentioned natural elements in the context of outdoor play environments; those who did perceived them in the context of playground aesthetics, but not as opportunities for furthering the development and learning of young children. Further, studies such as Creaser (1985) and Jones (1989) suggest that teachers' reflection on and re-evaluation of their immediate outdoor environments led them to create or use more stimulating settings to support more complex and productive play. This underscores the need to understand how teachers perceive a range of outdoor settings in order to help them develop the skills, knowledge, and attitudes for making effective pedagogical decisions relating to outdoor learning. Understanding early childhood educators' preferences and perceptions of outdoor settings is an important step toward bridging a potential gap between research and practice, helping guide professional development efforts by teacher educators and environmental educators to encourage selection and use of quality outdoor settings within early childhood education. Understanding early childhood educators' preferences and perceptions is also helpful for park/land managers, as they may manage natural settings that, from a research perspective, are ideal settings for learning and development, yet lack characteristics that educators look for in judging feasibility for use with young children.

METHODS

The purpose of this study was to explore inservice early childhood educators' preferences regarding outdoor settings as learning environments, their perceptions as to characteristics of outdoor settings that make them conducive to learning within early childhood education, and the educational opportunities and needs they associate with these settings. Further, this study sought to explore differences in preservice and inservice early childhood educators' perceptions and intended/ use of outdoor settings, as well as the alignment of preferences with literature-based characteristics pertaining to natural playscapes. Environmental educators and land/park managers, working with the early childhood teacher education community, can use this understanding of preferences and perceptions to guide the development and provision of professional development, programming for young children at nonformal sites, and other capacity-building efforts to encourage use of natural settings and nature experiences in early childhood education.

Participants

Participants consisted of 46 inservice early childhood educators in licensed childcare centers, preschools, or Head Start programs in a city in northern Minnesota. Two recruitment strategies were used to invite participants. The school district maintains a list of 50 licensed childcare centers, preschools, and Head Start providers that is shared with parents of preschool-aged children during early childhood screenings, as well as being publicly available. All providers on this list received an invitation to participate addressed to the lead teacher/educator of preschool-aged children. Thirty-three participants were recruited through this strategy. The remaining 13 participants were recruited through the university located in the same city, which has a program for inservice early childhood educators with associate degrees who are working toward a bachelor's degree in early childhood education while currently working as a childcare provider or preschool teacher (program enrollment was 13, and all elected to participate).

Research instrument

The research instrument (see Appendix) was similar to the instrument used in Ernst and Tornabene (2012) and consisted of a questionnaire to be used with a set of 16 photographs. All photographs were from late spring and none contained people or wildlife, so as to keep these factors from potentially influencing preference selections. The photographs were of four outdoor setting types found within the part of the state where the early childhood educators are located: water, woods, open field/grassy area, and park. There were four photographs in each setting type, and in each setting type there were photographs with maintained aspects and photographs that were primarily natural (undeveloped or unmaintained, based on the human influence setting attribute, as in Kaplan, 1985). See Table 1 for a description of the 16 photographs. Permission

was granted to use the photos in the study, but was not granted for publication in the journal for copyright reasons. The questionnaire can be obtained by contacting the author.

Table 1
Description of Outdoor Setting Photographs

Outdoor Setting Type	Setting Label	Photograph Description	Human Influence Attribute
Water			
	13	Stream dotted with small rocks; water appears still; wooded/brushy vegetation on edge; narrow foot path leading down to water's edge	Natural
	14	Stream cutting through large rock outcropping, forming small waterfalls; dense forest/vegetation along rock outcropping	Natural
	15	Small lake with calm water; trail alongside edge of lake; small dock and shelter with canoes; forested backdrop	Maintained
	16	Shore of larger lake (likely recognizable as Lake Superior from its distinct pebbly beach), with forested shoreline	Natural
Forest			
	9	Dense forest with a wide paved trail winding through; visually "open" due to the wideness of trail, allowing enough sun to create shadows on pavement	Maintained
	10	Dense forest; narrow foot path winding through; very little light appears to be shining through forest cover	Natural
	11	Open forest with a mix of grasses/vegetation on forest floor; crushed gravel path lined by wooden fencing	Maintained
	12	Open forest, with vegetation, underbrush, and fallen trees on forest floor; no path	Natural
Open Field/ Grassy Area			
	6	Open natural area, with tall grasses, wildflowers, and a small wet area visible; several trees in the background	Natural
	5	Open natural area, with tall grasses, wildflowers, and a small wet area visible; several trees and a building in the background; gravel road leading to and alongside grassy area	Maintained
	8	Open area of grass and wildflowers, with a single tree near the foreground; no paths	Natural

	7	Open area of grass and wildflowers, with a single tree near the foreground; a gravel path with a wooden bridge midway	Maintained
Park			
	4	Open area with a mix of tall grass and wildflowers, with a forested background; park bench that seems almost hidden by long grass	Natural
	3	Open grassy area, with several park benches scattered about; grass is very short and appears mowed	Maintained
	2	Open area, with several large trees dotting foreground; pavilion with picnic tables; forested background; grass appears mowed	Maintained
	1	Playground on a raised woodchip-filled area, with mowed grass and trees in background	Maintained

The questionnaire asked participants to indicate the three settings they felt as being most conducive and three settings they felt as being least conducive to meeting educational outcomes for their preschool-aged students (educational outcomes referred to a range of potential outcomes, including cognitive, socio-emotional, physical, health and wellness, and environmental appreciation outcomes). This approach of using photographs to indicate outdoor setting (landscape) preference was based on the preference rating approach described in Kaplan (1985). They were further asked to indicate why they selected those settings as being most or least conducive to meeting educational outcomes for their preschool-aged students and what they would do with their students in these settings. Additionally, they were asked what they would need in order to use these settings with their preschool-aged students.

Procedures

An invitation/consent letter, questionnaire, and set of photographs were mailed to the lead preschool teacher of each of the 50 providers on the early childhood provider list maintained by the school district. Providers also received a prepaid mailer for returning the questionnaire and a gift card for an on-line bookstore in the amount of $5 in (advance) appreciation for their participation. Responses were received from 33 providers. Permission was requested from the university's early childhood teacher education faculty to visit the inservice early childhood educators enrolled in the bachelor's degree early childhood education program. All 13 educators consented to participate and received the same materials, but in person rather than through the mail.

RESULTS

Outdoor settings most and least conducive to achieving educational outcomes

Frequencies of responses selected by participants as being the three most and least conducive were used to address which settings inservice early childhood educators perceived as most and least conducive to achieving education outcomes with their preschool-aged students and to explore if personal preferences were related to educational preferences. The three settings with the highest frequencies of being selected as among the three *most* conducive were Setting 1 (playground), Setting 10 (dense forest with narrow footpath), and Setting 11 (open forest with fence-lined gravel path), $n = 26$, $n = 17$, $n = 16$ respectively. The three settings with the highest frequencies of being selected as among the three *least* conducive were Setting 14 (stream cutting through rocky outcropping forming small waterfalls), Setting 13 (narrow footpath through wooded area to stream dotted with small rocks), and Setting 3 (open mowed grassy area with park benches), $n = 22$, $n = 14$, and $n = 12$ respectively.

Table 2
Outdoor settings most and least conducive to achieving educational outcomes

	In-service Early Childhood Educators	Pre-service Early Childhood Educators[a]
Most Conducive	Setting 1 (playground)	Setting 1 (playground)
	Setting 10 (dense forest with narrow footpath)	Setting 2 (park pavilion in an open words)
	Setting 11 (open forest with fence-lined gravel path)	Setting 16 (the shoreline of a likely familiar larger lake)
Least Conducive	Setting 14 (stream cutting through rocky outcropping forming small waterfalls)	Setting 12 (open forest with no path)
	Setting 13 (narrow footpath through wooded area leading to stream dotted with small rocks)	Setting 8 (open, unmowed grassy area with no path
	Setting 3 (open mowed grassy area with park benches)	Setting 13 (narrow footbath through wooded area leading to stream dotted with small rocks)

Note: [a]Ernst and Tornabene (2012)

Table 2 provides a comparison of these results with the preservice participants in Ernst and Tornabene (2012). There appears to be both overlap and distinctness between the educational preferences of the inservice educators and the preservice educators in Ernst and Tornabene (2012). Both found the playground to be the most preferred setting. Both seemed to indicate preference toward outdoor settings with paths, with inservice participants selecting settings with paths for two of their three most preferred settings, and preservice participants selecting settings with no paths for two of their three least preferred settings. Inservice participants, however, seemed to recognize more educational potential in forests than preservice participants, and preservice participants seemed to perceive educational potential in a water-based setting, whereas two of the three settings perceived by inservice educators as least conducive educationally were water-based.

To further summarize and compare inservice and preservice participants' preferences, selections of the setting most conducive to achieving educational outcomes (the setting they listed first for each) were re-coded by outdoor setting type (water, forest, open field/grassy area, park) and also by human influence attribute (natural or maintained). Regarding educational preferences, most inservice and preservice participants (from Ernst and Tornabene, 2012) selected an outdoor setting that was a park (setting type) and maintained (human influence attribute) for the outdoor setting they perceived as most conducive to achieving educational outcomes, with the least frequent selections being the open field (setting type) and natural (human influence attribute). However, there were more inservice participants selecting a natural setting as most conducive (n = 20) relative to the number selecting maintained setting (n = 26), as compared to the number of preservice participants (n= 22) selecting a natural setting relative to the number selecting a maintained setting (n = 87). See Table 3.

Table 3
Preferences by Outdoor Setting Type and Human Influence Attribute

	Frequency of Inservice[a] Participants Selecting Setting as Educational Preferences	Frequency of Preservice[b] Participants Selecting Setting as Educational Preference
Outdoor Setting Type		
Park	22 (48%)	67 (63%)
Forest	11 (24%)	19 (18%)
Water	7 (15%)	12 (11%)
Open field/grassy area	6 (13%)	8 (8%)
Human Influence Attribute		
Maintained	26 (57%)	87 (80%)
Natural	20 (43%)	22 (20%)

Note: [A]N = 46; [b]N = 106, 109 from Ernst and Tornabene (2012)

Characteristics of educationally-conducive outdoor settings

Coding of inservice participants' open-ended responses to why they selected those particular most and least preferred settings was used to investigate the characteristics that make outdoor settings most conducive to achieving educational outcomes. The process described in Fink (2003) guided the coding process. The most frequent reasons as to why a site was most conducive to achieving education outcomes was opportunities for unstructured play and easy to use, and the most frequent reasons as to why a site was least conducive was safety hazards, difficult to use, and lack of things for children to do. These most frequent reasons mirror the reasons given by preservice participants (in Ernst and Tornabene, 2012); see Table 4. A response unique to the preservice participants in Ernst and Tornabene (2012) was opportunities for structured learning about nature as a characteristic of an educationally-conducive outdoor setting, while lack of opportunities for exploration was a response unique to inservice participants regarding characteristics of settings least conducive to achieving educational outcomes.

Table 4
Characteristics of Educationally-Conducive Settings

Reasons Why Most Conducive(frequency)		Reasons Why Least Conducive(frequency)	
Inservice	*Preservice*[a]	*Inservice*	*Preservice*[a]
Unstructured play opportunities (27)	Easy to use (42)	Safety hazards (33)	Safety hazards (47)
Easy to use (18)	Unstructured play opportunities (22)	Difficult to use (10)	Lack of things for children to do (37)
Opportunities for unstructured learning about nature (10)	Opportunities for structured learning about nature (21)	Lack of things for children to do (6)	Difficult to use (13)
Safe (9)	Opportunities for unstructured learning about nature (11)	Lack of opportunities for exploration (4)	
Familiar (1)	Safe (8)		
	Familiar (5)		

Note: [a]Ernst and Tornabene(2012); Respondents could provide more than one reason.

Educational affordances and resource needs

To explore activities and resource needs inservice early childhood educators associate with the educationally-conducive outdoor settings, responses from the open-ended questions regarding the three settings they had selected as most conducive were coded and frequencies calculated. Results are summarized in Table 5 and Table 6. There were two most frequently listed activities for their three most conducive settings combined –

nature hike and unstructured play for physical, health or social benefits. This is generally consistent with preservice responses in Ernst and Tornabene (2012), as unstructured play and nature hike were among the top three educational affordances. Preservice respondents' most frequently-listed activity was teaching about nature. In contrast, inservice respondents tended to be more specific in describing structured learning about nature (nature classification, observation and collection) and the frequency of this structured learning about nature response was not as high in the inservice participants relative to other responses as it was for the preservice participants. The most frequently listed resource needs were field equipment specific to the activity, extra adult supervision, and appropriate shoes. While preservice participants in Ernst and Tornabene (2012) listed similar resource needs, they did not identify the logistical resource needs that inservice educators indicated (transportation, access to bathrooms and drinking water, signs indicating where to go).

Table 5
Activities Associated with Educationally-Preferred Outdoor Settings

	Frequency of Inservice Participants	Frequency of Preservice[a] Participants
Nature hike	27	63
Unstructured play for physical/health/social benefits	27	60
Look for/collect nature items	18	--
Unstructured nature play and exploration	15	29
Nature identification/classification	13	--
Teach about and discuss nature	13	101
Picnic	12	21
Teacher-led outdoor games	12	--
Reading or art activities	--	9
Pick up litter	--	2

Note: Numbers represent the frequencies of participants indicating that particular activity;
[a]Ernst and Tornabene(2012); respondents could indicate more than one activity.

Table 6
Resource Needs Associated with Educationally-Conducive Settings

		Frequency of Inservice Participants	Frequency of Preservice[a] Participants
Safety-related			
	Extra adults to supervise children	12	75
	Appropriate shoes	12	16
	First aid kit	2	7
	Sunscreen	4	--
	Nice weather	3	5
	Safety rules/behavioral expectations	3	3
	Clearly marked boundaries	2	--
	Instructor knowledge of safety hazards	1	--
Materials		15	34
	Field equipment specific to activity		
	Bags/jars for collecting	10	27
	Recreational equipment for games	5	--
	Lesson plans	4	19
	Worksheets	--	2
Content/information-related			
	Field guide for instructor	7	20
	Prior knowledge/background information	2	13
	Naturalist to accompany group	--	4
Logistical			
	Transportation	9	--
	Access to bathrooms	7	--
	Access to drinking water	5	--
	Signs indicating where to go	4	--

Note: Numbers represent the frequencies of participants indicating that particular need; [a]Ernst and Tornabene(2012); respondents could indicate more than one need.

DISCUSSION AND IMPLICATIONS

There are several similarities between the inservice and preservice early childhood educator participants that are worth noting. For both, the playground was perceived as most conducive to meeting educational outcomes; likewise, both groups indicated a preference toward parks (rather than forests, water, and fields/grassy areas), as well as a preference for maintained rather than natural settings. These preferences are consistent with their use/intended use of these settings for unstructured play and their preference for settings that are safe and easy to use. This suggests a need for professional development/pre-service preparation that includes how outdoor settings other than parks and playgrounds can support unstructured play, as well as how particular outdoor settings are more conducive to certain kinds of play than others (for example, playgrounds providing opportunities for functional play, where as a natural setting with a lot of loose parts provides opportunities for constructive and symbolic play; see Hamarstrom, 2012 and Parsons, 2011). This also suggests a need for park/land managers to consider using some of their natural settings as places where unstructured play is not only allowed but also encouraged, where, for example, travel off-trail is allowed, natural items can be collected, and where the setting as a whole can be manipulated. In addition, park/land managers might consider making some of their natural settings easier to use (signs, boundaries, access to bathrooms and drinking water, etc.). And in light of the frequency extra adults for supervision was listed as a need, parks/land managers and nonformal environmental educators might expand how they perceive their role to include serving as an extra adult to help early childhood educators supervise young children in play in natural settings.

Regarding inservice and preservice participants selecting settings because they are perceived as safe, and in light of safety hazards frequently indicated as a reason for sites being perceived as least conducive, inservice and preservice early childhood educators may benefit from reading and discussing literature pertaining to playground safety, risk perception, the role of risk in developing resiliency in children, and managing risk in play provision (for example, Almon, 2013; Ball, Gill, & Spiegal, 2012; Gill, 2007; Finch, 2012; Rosin, 2014). This seems particularly important in light of relatively little attention being paid to outdoor settings in the preservice preparation curriculum (Renick, 2009), and also in light of the National Association for the Education of Young Children accreditation standards' (2008) emphasis on safety (in the section on outdoor environmental design in the physical environment standard, 5 of the 7 criteria focus on safety and protecting children from hazards, with one focusing on how much space is needed per child, and one focusing on developmental appropriateness).

Regarding differences between inservice and preservice early childhood educator participants, preservice participants more frequently selected water settings as being educationally conducive, and inservice participants more frequently selected forest settings. It is unclear as to why this distinctness in preference exists, as responses to other survey items didn't indicate why this may be. However, since both forest settings

and water settings offer nature play potential, it is important again to emphasize the range of possible natural settings for nature play in preservice preparation/inservice professional development efforts and how each setting can be used safely and feasibly. Another difference to note is the higher prevalence of preservice participants indicating a desire to use the outdoor settings for direct instruction about nature, which is in contrast to the inservice participants expressing concern about a lack of opportunity for children to explore and selecting settings that they felt provided opportunities for unstructured learning. This would suggest the need for efforts within preservice preparation that highlight the value of unstructured learning about nature, which is so strongly advocated for within the *Early Childhood Environmental Education Programs: Guidelines for Excellence* (2010). While there is room for teacher-initiated learning about nature in quality early childhood environmental education (Wilson, 1996), there should also be child-directed and inquiry-based learning about nature, as well as play and exploration in nature (NAAEE, 2010). Preservice preparation and inservice professional development in developmentally appropriate, quality early childhood environmental education might lessen preservice and inservice educators' perceived need for items such as content/background information, lesson plans, worksheets, and field guides.

An additional difference was inservice participants indicating logistical needs, such as transportation, access to bathrooms and drinking water, and signs indicating where to go; preservice teachers did not indicate these needs. This difference is likely reflective of differing levels of teaching experience. These logistical needs may serve as an obstacle for early childhood educators, helping explain why they may not actually use natural settings as much as they'd like (as in Simmons, 1993 and 1994). Children spend a substantial amount of their time in childcare settings. Of the children under age five in the U.S., almost 11 million (63%) participate in some child care arrangement every week, and on average spend 36 hours per week in child care (National Association of Child Care Resource and Referral Agencies, 2013). For many children, their schoolyards/play yards in their childcare setting may offer the only outdoor playscapes that children experience on a daily basis (Parsons, 2011). Consequently, if transportation to natural settings is unavailable, there is a need for professional development efforts that raise educator awareness of the importance of research-based features of quality playscapes, such as green structures, loose parts, and diverse topography and ground cover (Lester & Maudsley, 2006). This raised awareness may lead them to create or use more stimulating nearby settings to support more complex and productive play, as was seen in Jones (1989). Professional development efforts also might include "how-to" workshops, where educators learn the design principles for creating natural playscapes, as well as introducing educators to ideas for "do-it-yourself" playscape projects and low-cost ways to enrich playscapes, such as those listed in Keeler (2008).

The research literature suggests the importance of settings for nature play that are have diversity and variation in vegetation type and density, as well as diversity in ground cover, slope, and topography. Many of the photos in this study illustrated this diversity

and variation. Preservice and inservice participants' responses as to most and least conducive sites didn't suggest a pattern relating to diversity and variation. Settings such as the playground, park pavilion, and dense forest with one type of tree were selected as among those most conducive, yet lacked apparent diversity and variation. Similarly, settings that showed diversity of topography and terrain were among sites selected as least conducive. However, also among their selections of sites least conducive to educational outcomes were settings that were clearly non-diverse, such as the open mowed grassy area and the open, unmowed grassy area. Thus, it is unclear from their selection of settings the degree to which participants recognize the value of diversity and variation in outdoor settings. However, when asked as to what makes a setting conducive to meeting educational outcomes, responses did not include characteristics such as diversity of vegetation or diversity of ground cover. This suggests a need for inservice professional development and preservice preparation efforts that help educators recognize the importance of these characteristics in providing a wider range of learning opportunities not available from other outdoor play space options (Frost, 1992).

Settings that are unstructured and can be manipulated are also emphasized in the research literature. Preservice respondents selected the pebbly shoreline of a large lake as among sites perceived as educationally conducive; this setting is well-aligned with Nicholson's (1971) use of seashores as an ideal example of a physical environment that has a constantly changing nature, a degree of disorder, and a range of found components that provide endless possibilities for play, interaction, exploration, discovery and creativity. Two of the settings selected as educationally conducive by inservice respondents (the dense forest with narrow footpath and the open forest with fence-lined gravel path) could be considered as having a degree of disorder and containing loose parts, yet the paths (particularly the fence lined path), while conducive to being used for nature hikes, suggest more of a structured nature, connoting "what should be done" rather than "what could be done." Similarly, their responses as to why they perceived these sites as educationally conducive didn't include references to being unstructured or manipulative.

Similarly, two of the three settings selected by preservice participants as being least conducive had no paths. This seems consistent with preservice and inservice participants' preference for sites that are easy to use, as well as for the inservice participants' responses regarding needing signs that indicate where to go. This would suggest that these educators perhaps are less aware of the importance of unstructured or "disorderly" settings and the open-endedness of natural materials (materials where there isn't a single right way to use them) in fostering creative and imaginative play, problem-solving, and cooperation. It seems that while respondents recognize the value of unstructured play, efforts to raise their awareness of unstructured environments are needed. And as noted prior, this may result in reflection on and re-evaluation of their use of outdoor settings, leading them to create or use more stimulating settings, as in Creaser (1985) and Jones (1989).

CONCLUSION

Although often associated with physical movement, outdoor settings can be as effective as indoor settings in enhancing young children's development in all domains (Henniger, 1993). While outdoor environments are important settings for young children's development and well-being, natural outdoor environments in particular hold endless possibilities for learning and development across all domains, and the importance of nature experiences in early childhood education is well established in the research literature (Irving, 2014). Natural settings offer "a diversity of environmental stimuli that contributes to increased use of senses, increased health benefits, interactive physical activity, and experimentation with social situations that prepare children for future life experiences" (Parsons, 2011, p. 11). Yet many childcare outdoor environments in the U.S. consist of isolated pieces of equipment and a monoculture of grass (Herrington & Studtmann, 1998), with little room for creative play on equipment with a finite number of ways to be used (Walsh, 1993).

Similarities across the preservice responses in Ernst and Tornabene (2012) and inservice responses from this study suggest a stability or consistency that is useful for understanding how early childhood educators perceive a range of outdoor settings. For both, the playground was perceived as most conducive to meeting educational outcomes; likewise, both groups indicated a preference toward maintained rather than natural settings. These preferences are consistent with their use/intended use of these settings for unstructured play and their preference for settings that are safe and easy to use. This suggests a need for professional development/pre-service preparation that includes how outdoor settings other than parks and playgrounds can support unstructured play, as well as how particular outdoor settings are more conducive to certain kinds of play than others. Further, this suggests an opportunity for environmental educators to work with park/land managers in modeling how more natural outdoor settings can be used in a safe and feasible manner to promote unstructured play.

In spite of considerable overlap, some unique insights surfaced through this study of inservice early childhood educators. Perhaps because of their teaching experience, inservice early childhood educators were able to offer additional insight into logistical needs (transportation, access to bathrooms and drinking water, signs, and clearly marked boundaries), as well as their desire for settings that offer possibilities for exploration. These needs and preferences provide an opportunity for park/land managers to consider how they might make portions of their natural settings seem more feasible and desirable to educators for use with young children.

While it is unclear from participants' selection of settings and responses the degree to which participants recognize the value of diversity, variation, manipulability, and unstructuredness in outdoor settings, the results seem to suggest these characteristics may not be at the forefront of early childhood educators' thinking about outdoor

settings. Instead safety and feasibility may be guiding their assessment of the appropriateness of a particular outdoor setting. This understanding can guide professional development efforts to encourage selection and use of quality outdoor settings within early childhood education, helping bridge a likely gap between research and practice and overturn prevailing practice regarding outdoor settings requiring less educator attention than indoor settings.

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APPENDIX

Questionnaire Items used in the Early Childhood Educator Study

Note: Questionnaire used in Ernst and Tornabene (2012) can be obtained through an email to the author.

Instructions for Participant:

This survey is to be completed by the person at your center/site considered to be the lead teacher of preschool-aged children. After completing this survey, please return it with the photo packet in the return mailer. Please note this survey pertains to preschool-aged children; thus, if you also care for children of other ages, please respond based on what is true for your care of preschool-aged children. For this study, "educational outcomes" refers to cognitive, socio-emotional, physical, health and wellness, and environmental appreciation outcomes.

Using the set of photos provided in the plastic envelope, please answer the following questions. In doing so, please note that each photo has a number on the back; you can use that number as the label for the photo. Also please do not write on the photos, as others may be using this same set in the future. Thank you!

1. Which three places do you feel are *most* conducive (best suited) to meeting educational outcomes for your preschool-aged children? (Educational outcomes refers to

   Photo # _____, Photo # _____, and Photo #_____

2. Why did you select these three photos? What about these places/photos make them the ones you feel are most conducive to meeting educational outcomes?

3. For each of the three photos you selected, please indicate what you would do with your preschool-aged children in a place like this.

Photo#___:

Photo#___:

Photo#___:

4. For each of the three photos you selected, please indicate what you feel you would need in order for it to be a successful outing to this place for you and your preschool-aged children.

Photo#___:

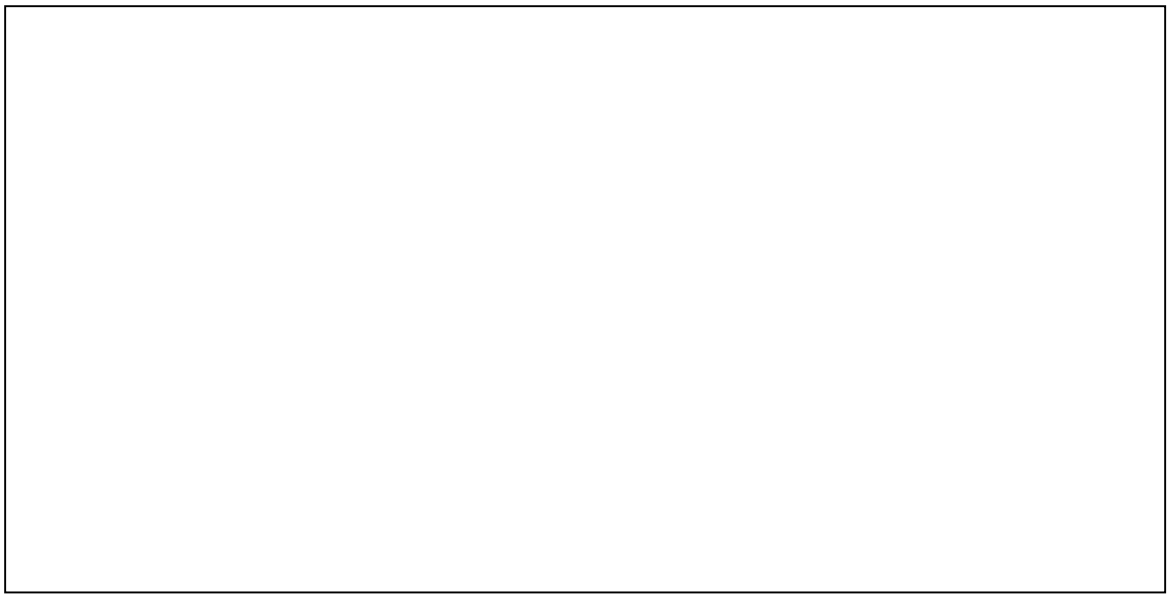
Photo#___:

Photo#___:

5. Which three places do you feel are *least* conducive to meeting educational outcomes for your preschool-aged children?

   Photo #___ Photo #___ Photo #___

Why did you select these three photos? What about these places/photos make them the ones you feel are least conducive to meeting educational outcomes?



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Creative Connecting: Early Childhood Nature Journaling Sparks Wonder and Develops Ecological Literacy

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While nature journaling with elementary age children has recently increased in popularity, journaling with children of ages 2-6 is often overlooked. This article focuses specifically on why journaling is a valid practice in early childhood and the practitioner application of journaling techniques modified for the young child. Young children have an inherent sense of wonder and connection to their natural world which can be preserved and enhanced through the cultivation of observation and documentation. The young child, working either one-on-one or in small groups with the adult, can begin to consciously explore the nearby nature of their world. The addition of a journal practice to regular outdoor environment exploration allows the child to assimilate their observations and experiences while laying a foundation for literacy education.

The young child's nature journal is a place for the recording of the natural insights and wonder as developmentally appropriate, rather than the more scientific data collection purposes of an older child's field journal. It is a place for color exploration and recording of the special relationship between the young child and their world through abstract drawings and adult documentation of verbal observations. Prompts may be used with young children, as well as scenarios that enhance seasonal observations, but the journal is foremost a place for spontaneous observation development and "nearby nature" connection facilitation. Drawing on the research of Eyunsook Hyun and Maria Montessori, and the work of Rachel Carson, Clare Walker Leslie, Bill Plotkin, and David Sobel, this article will provide early childhood educators with the resources and motivation to incorporate a sensorial-based journaling practice into their environments.

Keywords: nature journaling, young children, teacher guidance

While nature journaling with elementary age children has recently increased in popularity, journaling in early childhood is often overlooked. Nature journaling is an extremely valuable and valid practice in early childhood environments for facilitating the child's growing bonds with nature as well as meeting a teacher's need to justify increased outdoor time to administrators and parents[1]. During the early childhood sensitive period for language development, the natural world can be both an inspiration and a teacher by experientially sparking the child's interest in oral and written language. The act of processing early childhood's natural experiences through language and written expression is invaluable for encouraging deeper nature connections and for allowing wonder to fuel a lifetime of loving learning. While the majority of research on this topic is anecdotal and experiential, it should be considered a useful foundation for building further data on the role nature plays in language development.

Nature journals have the ability to play a significant role in increasing the academic importance of integrating the natural world into language curricula. Journaling encourages the child's sense of wonder by providing a place to record nature experiences in images before written language skills are fully developed. They help solidify the connection between the child and her nearby nature, which as research shows is extremely important during early childhood for developing the naturalist intelligence. Journaling gives the child an outlet to assimilate her nature observations and experiences through drawn and collaged images and then express those through oral language. The journal provides experiential documentation of both literacy and ecological literacy development.

Additionally, support for, and the benefits to, teachers wanting to integrate a journal practice into early childhood environments should not be overlooked. Early childhood educators will find that the child's nature journal provides a chronological anecdotal assessment tool to track skill development as well as creates a portfolio to share with the child's parents and future teachers. The journal documents the child's insights regarding their budding relationship with the natural world. It facilitates assimilation of the child's daily nature experiences. It provides an outlet for motor development through drawing and for language development through story telling. For the young child, the journal is less a place for data collection and more a venue for recording developing insights about the her place in the natural world.

Experiential educator, psychologist, naturalist, and wilderness guide Thomas Smith says, "Words without experience are just words; experience without words is just experience" (Smith, 2011). His philosophy emphasizes the role nature journaling plays in the assimilation of experience, in aiding and improving observational skills, in providing a place to document field investigations, and for serving as a cross curricular forum for the child to relate to the natural world. This idea of linking experience and words is very

[1] Forest Kindergartens are an additional resource for the precedent of increased outdoor time. See the Cedarsong Nature School's Cedarsong Forest Kindergarten as an example

effective in early childhood and supports the philosophy of Maria Montessori regarding the sensitive period for language and its development through hands-on learning. It also supports Howard Gardener's theory of the development of the naturalist intelligence.

What better place to motivate academic learning than in outdoor classroom environments! Research indicates that time spent outdoors increases enthusiasm for learning, focus, and behavior[2]. The early childhood environment can more easily take full advantage of the current recommendations of increased outdoor time, because "recess" is already accepted and encouraged, unlike in elementary and secondary environments where outdoor time is increasingly being reduced. The key is to provide early childhood teachers the resources and tools to create outdoor experiences that are less "recess" based and more ecologically meaningful for the child through the availability of academic and play based nature assimilation experiences, like nature journaling.

The theory that "One transcendent experience in nature is worth a thousand nature facts" or that the experience "...may have the potential for leading to a thousand nature facts" (Sobel, 2008) is an interesting idea from which teachers can promote increased outdoor learning to administration and parent populations. The idea of facilitating active "transcendent" natural experiences, rather than passive presentations of facts, encourages further thought about how experiential learning and outdoor activities spark wonder and systems thinking[3]. This theory is a cornerstone of Montessori method and is regularly observed by Montessori teachers as students engage in inspired research projects set in motion by a sensorial experience with the natural world[4]. For example, the discovery of an interesting caterpillar in the outdoor environment is documented in the nature journal, which initiate deeper study of the species. Creative execution of this theory of sparking the child's emotions toward the natural world before presenting the facts increases the educational value of all time spent in the outdoor environment, including during "recess" and free play times.

The nature journal as a spark for natural wonder and connection

> "In early childhood, activities should enhance the developmental tendency toward empathy with the natural world" (Sobel, 1996).

In a 1956[5], Rachel Carson first presented the consideration that "If a child is to keep alive his inborn sense of wonder...he needs the companionship of at least one adult who can

[2] http://www.childrenandnature.org/research/

[3] See the Center for Ecoliteracy for more information on creative outdoor learning as a tool for understanding nature as a teacher for systems thinking. "Seven Lessons for Leaders in Systems Change"

[4] *Education for a New World* by Maria Montessori provides an overview of the practices of "following the child" and the teacher as observer and guide as pertaining to experiential learning and the child's personal and academic development.

[5] The article "Help Your Child to Wonder" was first published in a 1956 issue of *Women's Home Companio*n and later published in 1965 posthumously as the book *The Sense of Wonder.*

share it, rediscovering with him the joy, excitement and mystery of the world we live in" (Carson, 1965). The necessity of bonding with nature in childhood (for the long term goal of environmental responsibility in adulthood) is a task now often relinquished by parents and left to the teacher. Some educators and researchers even believe that modern "neighborhoods, changed by technology and society, have weakened as growth fostering settings for children" (Rivkin, 1995) and that this degradation of "nearby nature[6]" play space has created an even greater necessity for educator intervention through the creation of place-based nature experiences (with the aim of preventing further isolation between young children and their communities).

Nature experiences at school may be a child's primary exposure to her natural world and the place where important bonds and ideals are formed. This is why it is imperative that early childhood environments have quality outdoor classrooms that function as more than just a place for children to "let out energy." They must encompass elements to attract wild nature, such as birds and butterflies, and they must provide sensorial experiences for the child to work[7] with textures and real tools. An example of this could be a worm bin in which the children are permitted to dig, handle and explore the actual worms while caring for the worms through feeding and tending of the soil or tending a butterfly garden. These are both small and nearby places of nature with appropriate elements of "wild" that teach the young child about empathy, while providing outlets for the development of motor skills, language, and naturalist intelligence. In situations such as these, the young child's nature journal becomes a venue for drawing worms, abstractly expressing the colors found on a butterfly's wings, and creating stories that sequence events and help the child assimilate her relationship with the "wild" creatures alongside the adult sharing the experience.

A groundbreaking pattern in environmentally committed adults was discovered by Louise Chawla and supports Carson's declaration. Chawla perceived that environmentalism grows from "The combination of 'many hours spent outdoors in a keenly remembered wild or semi wild place in childhood or adolescence, and an adult who taught respect for nature'" (Sobel, 2008). Though Carson stated this in 1956, it has taken time for research and data on the subject to be collected and studied. This finding is referenced often by place-based educators such as David Sobel and in many writings on the childhood and nature connection from the past fifteen years. It also mirrors a century's worth of educator instructions from the Nature-Study advocates and progressive educators. From Carson herself to Aldo Leopold to Joseph Cornell[8], adults committed to the preservation of the natural world all had childhoods immersed in nature and an adult companion to guide them and help assimilate the experiences.

[6] As defined by Gary Naban in *The Geography of Childhood*

[7] Work being defined in the Montessori sense as purposeful activity

[8] For further exploration on childhood nature bonds influencing adult environmental ethic, see Cornell's work *Sharing Nature with Children* and Leopold's *A Sand County Almanac.*

A future society of "green thumbs"

Humans are born with a propensity for a "green thumb" or naturalist intelligence. The naturalist intelligence[9] is an evolutionary survival tool or "a nature given intellectual culture and ability we all have in order to survive as human beings" (Hyun**,** 2000b) according to Howard Gardner's theories on the multiple intelligences. Those with strength in the area of the naturalist intelligence not only experience love of nature or interrelated systems separately but connect the two and apply them to problem solving in many areas. Therefore, the experiences accumulated in childhood can be said to define our ecological literacy and ability to "think globally and act locally." Ecopsyc**h**ologist Bill Plotkin's work applies nature based psychological and developmental research and method to develop "eco-centric," rather than ego-centric generations. Childhood is the developmental stage when nature experience is seen as "an appreciation of the world-as-it-is more than a desire to change it" (Plotkin**,** 2008). As ecologically literate educators, we must consistently provide children the opportunities they developmentally need as contributing members within the systems of the natural world if we are to develop a "green thumb", or "eco-centric" based outlook supported by a well-developed naturalist intelligence.

Eunsook Hyun presents theory on the idea of Gardner's "naturalist intelligence" (Hyun**,** 2000a) as explored in conjunction with its presence in an early childhood "sensitive period" (Hyun**,** 2000a). Hyun proposes that if the nature intelligence is not nurtured and "if the human environment does not provide a social-emotionally enriched and intellectually congruent support during the early childhood period [generally ages three to six], we may anticipate serious consequences regarding nature preservation which will negatively affect for all" (Hyun**,** 2000b). This research supports this author's observation of nature detachment in modern children's lives and supports her work reconnecting children with nature through gardening, journaling, and the arts, thereby fostering ecologically literate children who will, as adults, be champions of the environment.

When experiencing nature with children, adults must constantly and consciously try to think like children. They must enjoy nature for nature's sake and see the beauty and potential in little nature, like a rock or a stick. "For young children, [the] natural environment is an everlasting and dynamic stimulator, because children perceive the natural world through their primary perceptions, which are based on their sensory-directed experiences...these primary perceptions are 'bondings-to-the-earth'" (Hyun**,**

[9] Gardner specifically defines the naturalist intelligence as: "the human ability to discriminate among living things (plants, animals) as well as sensitivity to other features of the natural world (clouds, rock configurations). This ability was clearly of value in our evolutionary past as hunters, gatherers, and farmers; it continues to be central in such roles as botanist or chef.... The kind of pattern recognition valued in certain of the sciences may also draw upon naturalist intelligence (Checkley, 1997).

2000a). This sensitive period must be nurtured by providing appropriate activities for positive nature interaction throughout early childhood (ideally continuing through adolescence) to assure that adequate nature bonding occurs and the ecological brain and naturalist intelligence develop properly. The ecological brain's appropriate development within the sensitive period for the naturalist intelligence will in turn facilitate "green thumbs" and trigger biolphilia[10].

It is imperative that adults in the care of children are aware that "we may teach 'feeling of fear' or 'keeping distance' toward nature instead of promoting young children's curiosity and inquiry to learn and care about nature" which "may lead to either *biophilia* or *biophobia* depend[ing] on how adults respond to young children's wondrous mind" (Hyun, 2000b). Maria Montessori also stresses the importance of the teacher's reactions and their power to shut a child off from an experience or learning with merely a disapproving glance. No matter how squeamish an adult may be toward an aspect of the natural world (assuming the child is not in danger), they must never respond in a negative way to a child's enthusiastic presentation of any natural aspect. The adult must respond with wonder and open dialogue, while encouraging connections that help the child assimilate the sensorial experience. Keeping alive what Rachel Carson termed a "sense of wonder" is crucial for blossoming a future ecologically literate society in which all members inherently feel they have "green thumbs." David Sobel (1996) reminds that we must first allow children love nature before we ask them to save it.

As an addition to the research, Hyun provides experiential and interdisciplinary considerations for developing an early childhood environmental education curriculum guideline that cultivates the naturalist intelligence. These guidelines suggest a balance of direct nature experience as well as activities for reflection and assimilation of those experiences. The nature journal is the perfect outlet for these reflection activities. Students who have developed a strong naturalist intelligence not only experience love of nature or interrelated systems separately, but connect the two and apply them to problem solving in many subject areas.

Application of nature journal techniques for formal and non-formal educators

Maria Montessori observed that children want to "bring their activity into immediate connection with the products of Nature" (Montessori, 1948). To purposefully direct the child's work within a natural environment, we must prepare the environment[11]. The first

[10] Biophilia literally means the " love of life or living systems" and is the hypothesis presented by naturalist and Harvard biologist and researcher E.O. Wilson that there is an instinctive bond between human beings and other living systems; "the urge to affiliate with other forms of life." (Biophilia, 1984)

[11] The "prepared environment" is Maria Montessori's concept that the environment can be designed to facilitate maximum independent learning and exploration by the child. In the calm, ordered space of the Montessori prepared environment, children work on activities of their own choice at their own pace. They experience a blend of freedom and self-discipline in a place especially designed to meet their developmental needs. (NAMTA, 2014).

step to implementing an effective nature journal practice in early childhood environments is to create the "playground" space as an outdoor classroom and rename it as such. The outdoor classroom environment should include multiple small garden beds (or large flower pots) with flowers and vegetables to tend[12], designated places for free digging, natural climbing areas such as in small trees with low branches, a "wild" area such as a small compost or brush pile that can be manipulated and explored by the children at will, a wormery, bird feeders, natural loose-parts for play building, creation, and art projects, and a designated area or basket where nature journal and art materials can always be found.

Discuss with the children how the outdoor classroom is a place to use their bodies, minds, and senses to explore. Set the expectation parameters as appropriate to the individual environment and use the term of "outdoor exploration time" instead of "recess". This sets up the environment as a creative space rather than a screaming free-for-all spot. Circle based sensory observation activities are a great way to acclimate children to the space. Invite the children to sit quietly in a circle. Guide them through a few deep breaths. Then, have the children focus on one sense each circle session; they close their eyes (unless of course the sense is sight) and really acclimate to the natural sensory input coming from the environment. This practice gives children skills to calm their bodies when outdoors and tools that can later be applied to easeful acclimation in any new space.

It is important for the children to be encouraged to engage in the journaling process, in order to learn the techniques, between the ages of 18 months to 3 years. The journals become a consistent part of the prepared outdoor environment just as balls or bubbles are, and should always be available. The children who do not gravitate to it initially may need a little more adult guidance, but should never be forced. As they grow, and when they see their peers interested in the journals, those children's interest will follow. An appropriately prepared environment inspires the child to explore and learn, so we must put as much care into preparing our outdoor environments as we do the indoor if we expect the same high quality results.

Each week prepare a nature journal based activity, available daily in the outdoor classroom, for the children to engage with. These may be seasonal activities using color changing leaves or an academic based activity that ties indoor lessons to nature such as building the letter "A" with sticks and gluing it to paper. These planned activities are in addition to the regular designated nature journal times and free journal expression (which should always be encouraged by the teacher). In daily or weekly designated nature journal time, students are given a set amount of time to document any aspect of the outdoor classroom environment that sparks their wonder, which is then recorded in pictures and

[12] In environments with children ages 18 months to 3 years, always separate beds of edible and non-edible plants. Teach the children which plants can be picked and eaten and how to appropriately harvest from the plants. This is especially important when growing both edible flowers and butterfly plants as many butterfly plants are not edible.

in oral documentation by the adult, followed by a circle time for peer sharing of documented observations. Sharing experience and observation is an excellent way for students to assimilate their findings and budding naturalist intelligence while bonding over nature with peers. These practices are especially powerful for developing the naturalist intelligence and securing a strong relationship with place and should never be overlooked.

During designated nature journal time, teachers are encouraged to join the children at their children's own learning levels. The teacher no longer has to have all the answers! Together, the adult and child are the students and nature becomes their teacher. They explore and research their feelings and relationships about nature jointly. The child senses this equality and opens to new experiences. The nature journal is where connection to nature, empathy, and ecological literacy meld and flourish.

With children ages 18 months to 3 years, it is important to frequently integrate the journal process into outdoor exploration time through one-on-one teacher-student nature exploration. The adult follows the child as she sensorially explores a natural setting such as a garden, flowerbed, or nature trail. Letting the child's inquiry lead, the adult prompts the child to appropriately use her senses to explore her surroundings and offers the child the opportunity to communicate her findings in the nature journal. The adult then documents in writing any verbal observations and new connections the child makes.

During independent journal time with children ages 4 to 6, the teacher is encouraged to journal (and share) alongside the children. This models the importance and value of the journaling process. The 4 to 6 age group of children will become interested in using words and letters in conjunction with their drawings which can be independently added through the use of a word bank written on an outdoor chalkboard. Full sentences and short stories can be given orally by the child and written by the adult. As language develops, many 5 and 6 year olds become interested in writing their own sentences. It is important for the adult to ncourage the use of describing words, why and how connections, and the bigger picture of how it relates to the child's life. Once a regular journal routine is established, the nature journal becomes an anecdotal assessment tool for the teacher. Within the journal, the teacher has a portfolio of thought processes, systems thinking development, observation skills, nature connection, language development, and fine motor skills like writing and drawing. These all revolve around the child's growing relationship with her natural world. Within the pages of the journal, "the student has made her own connections with nature, and on her own terms" (Leslie, Tallamadge, & Wessels, 1996) and a documentation of the developing naturalist intelligence as well as the development of the child within her natural environment is invaluable for further improving the way we teach children with and for nature.

The role of the teacher in outdoor learning

Perhaps most importantly, when beginning to integrate nature journaling into early childhood environments, teachers must remember to engage the children in aspects of the natural world which personally inspire themselves. Teachers should think back on what they loved about nature as children and try to use those memories as motivation for the activities they create for their students. This practice builds confidence in outdoor teaching and sparks wonder in both the teacher and the children. The combination of wonder and confidence germinates the seeds of effective outdoor education.

Regardless of confidence, a lack of support can be one of the greatest obstructions to integrating purposeful outdoor experiences into classroom environments and daily schedules. Even when interest and enthusiasm are present, many teachers feel they are not qualified to lead children in Nature-study or view their own thumbs as "brown" when it comes to gardening (due to underdeveloped naturalist intelligences perhaps). These judgments hinder a teacher's justification of increased outdoor time to administration and parent populations. Incorporating nature journaling can help immensely with outdoor learning insecurities through its inherent inspiration of academic enthusiasm. Journals give the teacher an academic foundation for increasing outdoor learning time and something productive "to do" outside as the group becomes comfortable with outdoor learning. The continued education of teachers, administrators, and parents or other primary caregivers, on the health and academic benefits of nature in early childhood is an important action for experiential environmental education to become mainstream in early childhood education environments.

NATURE JOURNALING WITH YOUNG CHILDREN

The nature journal is a time tested way to document and assimilate nature experience and discovery and was a very popular pastime during the Nature-Study movement. Nature has been an inspiration to humans throughout history and nature journaling has been practiced by some of humankind's greatest thinkers, artists, naturalists, and scientists. The journal is a place to document observations and information, and then assimilate discoveries in a creative, yet scientific, way and is where many generate inspiration for their life work. Through journaling, patterns and observations discovered in nature that may have otherwise gone unnoticed or overlooked are tracked. This type of pattern work enhances students' ecological intelligence and connections to the natural world. It is a natural cross curricular learning tool that cultivates the skill of focused observation and regulates high energy levels generated from the excitement of being outdoors.

Journaling with students 18 months to 3 years is a very flexible process that focuses on the child expressing her thought about nature through color and abstract form and the teacher documenting the child's verbal expressions toward nature writing. Journaling

with students of ages 4 to 6 years is made available as both a structured activity and something to do independently. When outdoors, this age group can be given a prompt to explore in their journals, or journals can be made available for independent exploration during recess or allotted garden time.

After journaling, invite the children to share a favorite sketch or thought from their journals. This is a great way to encourage assimilation the experience, and assess the students' learning. Then, as developmentally appropriate, embark on group research projects that identify and elaborate on the children's discoveries. Any unidentified natural object can be explored in stories and picture book field guides. This makes the journal a springboard for early biological and historical research. The findings can then be prepared and presented to other classes, at a parent event, or on a bulletin board in a common area.

For those schools with strong technology initiatives, the nature journal is a beneficial tool to be used in conjunction with the iPad (or other implemented device). First, in the nature journals, track and record nature discoveries by hand. Then, use the digital device to photograph and document the discoveries in a blog or other digital scrapbook form utilized by the school for technology integration. While this author does not condone the use of technology in early childhood environments, if it is mandated, combining with the natural world is an effective way to balance the importance placed on technology with the importance of the natural world.

Techniques for journaling with children

Date each page entry and consider including other ways of tracking nature (such as recording the weather, temperature, or tides if in a coastal location). Children 4-6 can draw weather symbols, for example. Let students know that the journals are a place to record in words and pictures the things they see and discover in nature. They are also a place to record their questions and feelings about nature. Remember, the more the students (and the teacher) journal, the better they will get at observation, documentation, and detecting patterns in nature.

Create a nature journal

Of course, a nature journal can be made from any notebook or sketchbook, but there is something extra special about making the books. Journals can be made from materials found in the average classroom. The adult preparation time is about one hour for twenty-five journals. Remember to make a journal for yourself and any assistant teachers so everyone can journal together.

Materials for each book

- 8.5x11 inch sheets of paper (ideally 100% post-consumer recycled). The number of sheets will depend on how many pages are desired in the journal. More pages can be easily added later if needed.
- 1 piece of construction paper or other decorative cover paper, 9x12 inches
- 1 regular rubber band
- 1 thin stick or bamboo skewer, 8.5 inches long
- A single hole punch
- Colored pencils or markers to decorate the covers

Preparation

- Fold the 8.5x11 inch sheets of paper in half horizontally to create 8.5x5.5 inch folded sheets. Depending on the number of pages, the sheets may need to be folded in smaller groups and then compiled into one "book block" or stack of folded pages.
- Measure 1.5 inches from the top and bottom of the "book block" and punch a hole at each mark. Depending on the thickness of the "book block," the hole punching may also need to be done in smaller groups of pages and then the pages recompiled.
- Fold the cover paper in half horizontally.
- Measure 1.75 inches from the top and bottom of the cover paper and punch a hole at each mark.

Assembly

- Give each child a "book block," cover paper, rubber band, and stick.
- Insert the "book block" making sure all holes line up. Have the children check if they can see through the hole, if so, then they know the holes are lined up.
- Pinch the rubber band in half and from the bottom, thread it up through one hole so a little loop pokes through.
- Insert one end of the stick or skewer through the loop securing it from falling back through the hole. The stick will be on the top side of the journal.
- Flip the journal over and holding the rubber band tightly, stretch it to the other hole. Pinch and insert the rubber band through the hole. Thread it up through the hole so a little loop pokes through on the top side.
- Tightly holding the loop through the hole, flip the journal back over to the top side and slide the free end of the stick or skewer through the bottom loop securing it from falling back through the hole.
- Have children write their names on and decorate the covers.
- To add more pages, disassemble the book and add a second "book block" stacked underneath the first. Do not place the new book block inside or around the first

this will rearrange the journals chronological order. Reassemble the rubber band and stick or skewer.

CONCLUSION

As the research on the importance of nature connection in human life generally and in childhood specifically continues to be compiled and popularized, increased all-weather outdoor time will become easier for teachers to validate and actualize. Until mainstream education and culture fully embrace the necessity of a healthy natural world for a healthy human population, it is up to innovative and creative formal and non-formal educators to bring the child to nature and keep the inherent wonder and connection of childhood sparked. Starting in the early childhood outdoor classroom environment, we must facilitate meaningful nature connections through experiential activities like sensorial observations and nature journaling. These foster the naturalist intelligence and academic enthusiasm. We must continue these practices throughout childhood and adolescence, subsequently, transforming a culture of ecologically literate adults who possess the strengths of creativity, connection, expression, and assimilation, and who apply their strongly developed naturalist intelligence to environmentally responsible lifestyles. “Wonder and humility are wholesome emotions, and they do not exist side by side with a lust for destruction...by cultivating a child’s wonder, you are cultivating a future of hope” (Dunlap, 2012). Let nature be the guide and the child’s nature journal tell the story.

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Bridging the Gap: Meeting the Needs of Early Childhood Students by Integrating Technology and Environmental Education

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Children come from diverse backgrounds, particularly in terms of their access to the environment and technology. It is our job as teachers to help level the playing field and provide all students an equal chance to succeed. By integrating these two seemingly opposed curricular areas we can create an opportunity for young children to become both environmentally and technologically literate. This article explores how technology tools can be used to encourage students in early childhood programs to engage in activities that will help them appreciate natural resources while exploring environmental issues. Our goal is to examine the use of integrated technology within the environmental curriculum that will support the development of environmental and technology literacies in young children 3-6 years of age.

Nature deficit

Over 80% of the United States population now lives in urban areas, meaning that most of today's students live in either an urban or suburban environment (U.S. Census Bureau, 2010). Children are increasingly disconnected from outdoor pursuits and some never experience the natural world nor do they understand how they are a part of their community. If students go outside, they often see only streets, buildings, shops, cars, and more people. They not only have little understanding of their natural surroundings, but often have no opportunity for experiences that will help them develop an

appreciation for the serenity of a stream or the call of a bird. Many never visit a park, a natural area, observe wildlife, or plant a garden. Some may see a bird fly over but do they understand their place within their environment? Young children are often exposed to the importance of reducing pollution and recycling, but may not be taught or fully understand the reason behind these concepts. They may know that they can only water their yards on designated days, but do they understand why water rationing is necessary? How do they develop their environmental disposition without effective, meaningful environmental education? Early childhood programs make little if any effort to expose their students to environmental issues such as water rationing, contaminated water supplies, or pollution even though it is estimated that over 42% of the nation lives in areas where pollution levels are too high or too dangerous to breathe (American Lung Association, 2013).

In 1987, Jim Greenman postulated that children were losing habitat (the real world of people, nature and machines) and their ability to explore their world. Later, Richard Louv coined the phrase "nature-deficit disorder" in his book, *Last Child in the Woods* (2006). He discussed how today children lack the connection to the natural world when compared to previous generations. He stressed that children need to reconnect to the natural world. Environmental education is necessary to encourage students to become good stewards and to think globally but act locally regarding the environment and environmental issues. While today's children appear to be more comfortable at the computer or playing with electronics than being outside, educators are encouraged to draw upon their interest in and comfort with electronics to "re-introduce" them to the wonders of nature.

Environmental education is more than just learning about plants and animals and the environment. It is an invaluable tool for teaching critical thinking skills and applying these skills to the students' everyday world. Proper selection and use of technology can not only enhance these skills but stimulate interest and engagement in the world around them. The children of today are the decision makers and voters of tomorrow. The ultimate goal for environmental education is to create environmentally literate global citizens (Disinger & Roth, 1992). In order to accomplish this, educators must help students acquire a better understanding of their environment and natural resources as well as environmental issues affecting them.

For young children, environmental education is addressed through the basic premises of scientific inquiry: exploring, observing, communicating, organizing, applying, relating, and inferring (Arce, 2013). Children learn about the environment anytime they experience their natural surroundings. Educators can enhance children's explorations by providing them with interesting and enriching experiences that help them to explore outside of their direct environment and make connections and inferences within and between different phenomena in the environment. We create meaningful learning experiences when we help children to move beyond simple observations to more complex activities that require higher-level thinking and collaboration with peers. Many

of these experiences will be hands-on activities in the classroom or on supervised excursions (Arce, 2013). But educators can also integrate technology and media with environmental education through activities that encourage children to explore, create, problem solve, communicate, collaborate, document, investigate and demonstrate their learning about the world outside of their classroom. The North American Association for Environmental Education (NAAEE, 2010, p. 7) "beckons families, educators, and community leaders worldwide to take action, to strengthen children's connection to nature—making developmentally appropriate nature education a sustaining and enriching, fully integrated part of the daily lives and education of the world's children." We contend that developmentally appropriate technologies can be used to supplement experiences in the natural world especially when the curriculum is 1) Based on research and theory, 2) integrates authentic experiences, 3) is child-directed and inquiry-based and 4) related to the whole child (NAAEE, 2010).

The digital divide

One of the most remarkable changes in the classroom over the past two decades has been the incredible advances in classroom technology (Duncan & Young, 2003; Kozma & Voogt, 2003; Knapp & Glenn, 1996). The declining costs of technology have enabled schools to gain access to new technologies, while increases in access to advanced technologies offers classrooms new opportunities to explore different ways to explore and learn about the world around them (CEO Forum, 2000; SCANS, 1991; Solman & Wiederhorn, 2000). Schools and educational agencies are placing an emphasis on the use of technology as a teaching and learning tool because technology encourages teachers and students to work together as they explore ways to improve the teaching and learning process (Kontos & Mizell, 1997; Skarr & Spagnolo, 1995).

The International Education Technology Standards (ISTE, 2007) indicate that in order to be competitive workforce, children need to acquire basic skills in technology by the time they are five years old. For children from affluent families, with full access to technology, these skills are highly developed by the time they enter school but for children from less affluent homes, the ability to develop technological skills typically occurs in the school setting (National Association for the Education of Young Children [NAEYC], 2012).

According to the U.S. Census Bureau (2009), 31.3% of households do not have computer and/or Internet access. This number is higher for black (45.5%) and Hispanic (47.2%) households. This means that many students rely on the school setting to provide them with the necessary technological practice to prepare them for success as they go through the school system and prepare for the workforce or higher education. For young children, this includes becoming familiar with technological terms and the use of different hardware and software (Clements & Serama, 2003). They need plenty of time to explore and become familiar with the mechanics of these devices before we can expect them to use them purposefully and effectively (NAEYC, 2012).

The National Association for the Education of Young Children (2012) asserts, "when used wisely, technology and media can support learning and enhance relationships" (p. 1). When educators intentionally use interactive media to enhance the foundations that have already been established in their classrooms, children can explore and benefit from virtually endless resources. We are not advocating for the use of passive media or games that do the work for the children or simply entertain them. Our approach uses interactive technology in ways that help children to build connections to and dispositions toward the natural environment.

In addition to developing technology skills, integrating technology into the regular school curriculum provides students with additional tools to enhance their learning experiences. Technology can address different learning styles by helping students understand their experiences through verbal, written, spatial, quantitative, and/or graphical means. As a result of technology infused instruction more students become engaged in the learning process (Laird & Kuh, 2005). Technology can also be used to support a multidisciplinary approach to learning. The integration of different disciplines helps students combine their mathematical, logical, scientific, linguistic, artistic, and social knowledge to make their lives and interactions with the world clearer.

Technology can motivate today's children and be used to develop independent thinkers. Technology can provide opportunities for student-centered instruction, cooperative learning, and increase the interaction between the teacher and the student.
In order to introduce technology in age-appropriate and educationally effective ways, NAEYC and the Fred Rogers Center recommend that early childhood educators:

- Select, use, integrate, and evaluate technology and interactive media tools in intentional and developmentally appropriate ways, giving careful attention to the appropriateness and the quality of the content, the child's experience, and the opportunities for co-engagement.
- Provide a balance of activities in programs for young children, recognizing that technology and interactive media can be valuable tools when used intentionally with children to extend and support active, hands-on, creative, and authentic engagement with those around them and with their world.
- Prohibit the passive use of television, videos, DVDs, and other non-interactive technologies and media in early childhood programs for children younger than 2, and discourage passive and non-interactive uses with children ages 2 through 5.
- Limit any use of technology and interactive media in programs for children younger than two years to those that appropriately support responsive interactions between caregivers and children and that strengthen adult-child relationships.
- Carefully consider the screen time recommendations from public health organizations for children from birth through age five when determining appropriate limits on technology and media use in early childhood settings.

Screen time estimates should include time spent in front of a screen at the early childhood program and, with input from parents and families, at home and elsewhere.

- Provide leadership in ensuring equitable access to technology and interactive media experiences for the children in their care and for parents and families.

According to Copple and Bredekamp, in developmentally appropriate environments, educators use classroom technology "not to replace children's experiences with objects and materials but to expand the range of tools with which children can seek information, solve problems and perform transformations" (2010, p. 174). Further, they encourage shared learning and interaction, which includes increased amounts of talking, cooperating, and supporting.

We are not advocating for the use of digital media or technology tools to replace interactions and hands-on experiences, but believe that we can use technology to build skills and interests in the environment even though these two curriculum areas are seemingly opposed. The overall goal is literacy; literacy that prepares students to be contributing citizens of tomorrow.

Integrating curriculum to close the gap

New digital technologies are providing access to information, communication, and environments across the globe. Appropriate use of technology can have a positive effect on education because it offers all students equitable access to information and knowledge (Solman & Wiederhorn, 2000). Technology can be used to enhance student learning through involvement with authentic, challenging tasks, provide new roles for students and teachers, and create a culture that supports learning both in the classroom and beyond the school walls (Singh & Means, 1994). Technology can provide children with the opportunity to experience the natural world virtually when it cannot be experienced directly, for children who have limited access to the natural environment, technology can provide a realistic, interactive supplement or simulation. Screen media can expose children to people, animals, places and things that they may never have an opportunity to see and encourage them to get outside and experience the environment around them. In addition, with Web 2.0 tools, they can explore even further. For example, with the aid of technology students can not only see video clips of a Whooping Crane, but they can track its migratory route as it flies across states. For very young children, who are egocentric in nature, the teacher might explain that birds, like humans, go "home" on a regular basis. Relating the topic back to what the child already knows helps them to make connections and make sense of the curriculum in meaningful ways (Copple & Bredekamp, 2009).

When used appropriately, technology offers opportunities for interaction, modeling, and feedback, which can dissolve the current boundaries of the classroom environment. How can you simulate a nature walk through the forest if you are in downtown Chicago?

How can you simulate the sounds of nature when nature is far removed from the city setting? Technology can bridge those gaps in opportunity.

"Emerging technologies are steadily increasing their presence in classrooms and reshaping what and how students learn and the way teachers think about teaching, learning, and organizing the classroom" (Knapp & Glenn, 1996, p. vii). From using the World Wide Web (WWW) to using mobile tools, technology connections can excite the student about their environment and assist them in understanding environmental issues. Students, in collaboration with their teacher and parents, can create their own environmental messages or create a website promoting their school habitat. There is little doubt technology will continue to play a prominent role in education, and the education system must undertake the challenge of restructuring to prepare students to be productive in today's society (Kent & McNergney, 1999; Means, 2000). This requires the creation of more demanding goals for all students and providing curriculum and instruction that stimulates thinking and problem solving. As part of the goal of environmental education and developing an environmentally literate individual, these skills are necessary as students strive to address complex environmental issues. "If we have a vision of schooling that calls for students to work to their capacity, at their own pace, at tasks they find to be challenging and enjoyable, we are likely to be successful only if we take advantage of opportunities afforded us by new technologies" (Mehlinger, 1995, p. 22).

Teachers can use a variety of technologies such as the WWW, webcams, application software, digital tools, mobile devices and much, much more to enhance lessons and provide opportunities for children to interact with the environment. Children can learn about the place in which they live and environmental issues while increasing their readiness skills and literacy. These lessons can ignite the interest of children regarding their natural world and introduce them to the joy of discovery while instilling a sense of place and influencing their environmental disposition.

TOOLS FOR TEACHERS

Many technology connections are available that can be used to introduce children to the natural world and provide opportunities for interaction with the outdoors when the possibility of interacting with the outdoor environment is inaccessible or unsafe. Children can use technology to not only explore and examine their local neighborhood but also examine global issues. The following section provides descriptions of age-appropriate, interactive tools and resources and examples of how they can be utilized in the classroom.

Webcams

In simple terms, a webcam is a real-time camera that takes repeated images uploads the images to a webpage that can be accessed on the World Wide Web (WWW). Webcams can offer teachers effective ways of engaging learners with the environment in an interactive way. Webcams can bring distant places to the classroom and allow learners to observe events in "real time" Webcams can be used for videoconferencing and collaboration with learners and experts across the town, the state, the nation, or the world. Learners can observe and monitor changes in environments through inquiry-based activities that focus on higher order thinking skills. Webcams can bring environments from around the world into the classroom bringing the world beyond the classroom to life, inspiring curiosity and imagination while nurturing globally aware citizens.

Possible uses. Students can observe animals in the wild or at zoos. This allows the student to go to sites (locations) where they may not be able to go. For example, students can observe the behavior of the panda bears at the Atlanta Zoo. If migration is the topic of the day, watching the polar bears migrate in Canada can be accomplished via the Polar Bear International webcam. Of course, with webcams, sometimes the animals are active and sometimes not. However, you can often see snippets of the animals' activities from previous days or review the data recorded by scientists. With geological structures, students can actually keep up to date with such things as volcanic eruptions, shuttle launches, or tropical storms. For younger children, teachers can also set up webcams in the schoolyard, at the bird feeder, or at the garden. There are relatively inexpensive wireless cams available even some that record when they are tripped by motion sensors.

Resources.

- Panda Cam Atlanta Zoo (http://www.zooatlanta.org/1212/panda_cam)
- Eagle Cam (http://www.conservewildlifenj.org/education/eaglecam/)
- Polar Bear International (http://www.polarbearsinternational.org/)
- Volcano Webcams (http://bigthink.com/ideas/26619?page=all)
- NOAA Webcam (http://www.ssd.noaa.gov/VAAC/cams.html)
- National Geographic Education and Critter Cam (http://education.nationalgeographic.com/?ar_a=1)

Cameras and video

Digital cameras and video equipment offer learners an opportunity to share their views of the environment with their classmates as well as with other classes around the world. Young children have difficulty understanding the perspectives of others, but images and video can help even the youngest learners to see the perspectives of others, including where they live, where they learn and the environment around them. With the aid of

digital cameras and video tools the eyes of the learner can be used to capture elements of their environment. A digital image can capture a moment in time and allow learners to revisit an event or location over an extended period. Observing changes, asking questions, and making predictions over time allow learners to become directly involved in the processes they are monitoring. Digital image technologies allow learners to bring various elements of their environment into the classroom for extended discussion and examination. Learners can obtain images of various environments and makes comparisons of the differences they find. Digital cameras or videos can be taken along on field trips or be used to document classroom activities to create presentations, brochures, or posters of the experience. Digital images allow teachers to take their learners out of the classroom to capture "real-world" examples of environmental changes. Interacting with the environment with the use of High Order Thinking Skills (HOTS) will support awareness and understanding of the world outside the classroom.

Possible uses. Students can use cameras and videos to record data, conduct observations, or document events. Those that have access to a school habitat, can have the students take photos of the trees and shrubs throughout the year and document the different changes over time. They can document where they see specific insects or birds with digital cameras. Another option is to have them take pictures of specific shapes or colors or see what shapes they can find in the pictures they take.

Resources.

- Meaningful Connections : Using Technology in Primary Classrooms http://www.eric.ed.gov/ERICWebPortal/detail?accno=EJ784131
- Flip Video - Pre-K Pages http://www.pre-kpages.com/flip-video/ (Note: Flip Video camcorders are no longer being produced but the activities found on this link can apply to any camcorder)
- Using a Digital Camera in the Early Childhood Classroom http://www.examiner.com/article/using-a-digital-camera-the-early-childhood-classroom
- Digital Camera in the Preschool Classroom http://learningandteachingwithpreschoolers.blogspot.com/2011/03/digital-camera-in-preschool-classroom.html
- Digital Cameras for Kids: Cool Tools and Windows into the Minds of Children http://www.parentingscience.com/digital-cameras-for-kids.html
- Photo Factory http://www.pbs.org/parents/photo/
- Windows Movie Maker Live http://windows.microsoft.com/en-US/windows-live/movie-maker-get-started

Mobile technology

Mobile technology is entering the classroom at a rapid pace. Teachers and students have a variety of mobile technologies at their fingertips. Technologies that include

smartphones, iPods, iTouchs, iPads, tablets, and eReaders are providing learners access to a vast amount of interactive and collaborative tools. Each of the tools discussed above are now readily available on one of the mobile technologies. Placing access to the world outside the classroom walls in the hands of the learner opens up many opportunities for exploration, inquiry, and experience with other classrooms in their own neighborhood or on the other side of the world. Mobile applications (apps) provide tools that are developmentally appropriate, affordable, and culturally diverse. Students can quickly access a variety of music, images, video, and books that are representative of the many cultures around the world. Images, audio, and video can be captured and shared with a simple click of a button. The vast numbers of apps that operate on touch or motion support the developmental needs of the student.

Possible uses. Students can use mobile technology in a variety of ways inside the classroom and beyond. Tools with touch motion technology such as the iPad or iTouch afford interactions to young children who have yet to fully develop fine motor or reading skills. A collection of environmental education apps offers the classroom teacher opportunities to take instruction outdoors. Achievement-oriented action-based activities can be controlled by simple touch or motions, reducing the need for fully developed motor skills to control navigational buttons or controls. The number of available mobile applications (apps) expands exponentially every day, providing educators with an almost endless source of classroom options.

Resources.

- iPods in Early Childhood: Mobile Technologies and Story Telling http://www.ascilite.org.au/conferences/melbourne08/procs/olney.pdf
- Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8 http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf
- Apps in Education: Early Childhood and the iPad http://appsineducation.blogspot.com/2012/03/early-childhood-education-and-ipad.html
- 5 Great iPad Apps for Early Childhood Teachers http://certificationmap.com/5-great-ipad-apps-for-early-childhood-teachers/
- Teachers: Five Tips on When to use the iPad in the Early Childhood Classroom http://bridgingapps.org/2011/11/teachers-five-tips-on-when-to-use-the-ipad-in-the-early-childhood-classroom/
- Environmental Education Apps (suitable for young children) http://eeinwisconsin.org/resource/about.aspx?s=103138.0.0.2209

Scanners

Scanners are inexpensive tools that allow teachers to create digital images of a full range of objects that can be used in the classroom in a variety of creative ways.

Anything from learner work products to leaves from the campus trees can be digitized with the use of a scanner. Scanners can create digital images of plants, insects, or other specimens from the environment for retention and close-up examination. Once scanned images are created they can be integrated into numerous other programs for classroom activities.

Possible uses. Educators can scan in leaves from around the school or home and create keys for the identification of local plants. They could scan in any tangible product created by the children. The digital versions of the products could be archived in an electronic portfolio to be used for either alternate assessment or an end of school gift to the student and parents.

Resources.

- Using Digital Cameras and Scanners in the Early Years http://ictearlyyears.e2bn.org/resources_65.html
- Snappy Ideas for using Scanners in the Classroom http://teacher.scholastic.com/professional/childdev/snappyscannerideas.htm
- Five Creative Ways to Use a Scanner in the Classroom http://www.eduquery.com/papers/Rice/techedge/Five_Ways_Scanner.pdf

Probeware

Probeware is another inexpensive way to integrate technology into the environmental curriculum with hands-on activities that support inquiry-based projects. Probeware is available to measure a variety of environmental elements and offer learners an opportunity to be immersed in the environment through data collection and analysis of information gathered from the "real world". With the use of probeware an environmental experiment can be completed in minutes, devoting the rest of the time to discussion and analysis of the results obtained. This affords classroom time for learners to discuss their findings through classroom inquiry and collaboration. The portability of probeware offers convenience for field trips and use outside the classroom.

Possible uses. There are several types of probeware or educational applications of probes that students can use. Students can record data such as temperature, pH, visible light, and soil moisture. Once the data is recorded, they can download their data onto computers and analyze it (or look for trends). For the lower grades, educators may just want to focus on temperature or rainfall during calendar and weather discussions.

Resources.

- Article on children and probeware - http://mshstechintegration.asb-wiki.wikispaces.net/file/view/Real+Time+Science.pdf
- ProbeWare Resources http://www.tvdsb.ca/programs.cfm?subpage=142430

- Facilitate Student's Data Collection and Analysis with Probeware http://www.peterli.com/spm/resources/articles/archive.php?article_id=1068

Global Positioning Systems (GPS) and Geocaching

Currently the U.S. Department of Defense Global Positioning System consists of 24 satellites that orbit the earth at very high altitudes. The satellites transmit signals that facilitate the location of GPS receivers (GPSr). The receivers can be fixed on a location on the Earth's surface, in moving vehicles, aircraft, or in low-Earth orbiting satellites. GPS can be used in air, land, or sea navigation. They can be used for mapping, surveying, or other applications that require accuracy of positioning (National Park Service, 2008). A GPS can determine an approximate location of a GPS receiver. Locations are provided in longitude and latitude and can be used for navigation from one location to another (Ground Speak, 2008).

According to Cameron and Cameron (2004), geocaching is "equal parts scavenger hunting, hiking, outdoor adventure, and gift-exchange-with a technological twist" (p. xiii). Technology in the form of GPS receivers guide the user to the location of the cache anywhere in the world. A typical cache is a small waterproof container containing a logbook and "treasure," usually toys or trinkets of little value. Today, well over 480,000 geocaches are registered on various websites devoted to the sport. Geocaches are currently placed in over 100 countries around the world and on all seven continents, including Antarctica". Geocaching can be a great hands-on environmental activity for learners of all ages that can be exciting and motivating. Educators can create geocaching activities within their classroom, school or outdoor environment to help children learn to navigate their immediate environment.

Possible Uses. Students can build upon their own current understandings of geography by exploring geography through hands-on visual technology. Young children are inherently curious; providing a tool like GPS that is built upon exploration opens a variety of outlets for exploration within a controlled environment.

Resources.

- US Government Official GPS http://www.gps.gov
- Geocaching Website http://www.geocaching.com
- Global Positioning System Units and Geocaching http://little.usd259.org/modules/cms/pages.phtml?sessionid=&pageid=243902&

Blog

A blog (short for weblog) is another example of social software that continues to grow in popularity across all age groups. Blogs are ongoing personal online logs. This Web 2.0

tool can be used for tracking projects or recording daily information on any selected topic.

Possible uses. Journals have been kept by children of all ages for many years. The interactive blog tools add a visual dimension to the blogging world that goes beyond printed text. Even young students can record their thoughts, feelings and successes with the click of a button and the help of a teacher who can dictate their thoughts. Student with access to drawing tool on a classroom computer or mobile device can add illustrations to their thoughts. Setting up a classroom blog offers students and parents a medium to share valuable classroom experiences throughout the school year.

Resources.

- Hello Kids: Blogs for Kids http://www.hellokids.com/t_2856/blogs-for-kids
- Kidblog http://kidblog.org/home/

Podcasting

Podcast (i**Pod** broad**Cast**) is an audio broadcast that has been converted to an MP3 file or other audio file format for playback in a digital music player or computer. The "pod" in podcast was derived from the term "iPod," the most prevalent portable, digital music player, and although most podcasts are verbal, but they “may contain music” (pcMAG, 2008). The interactive ability of podcasts allows learners to share their experiences with others in locations around the world making their learning meaningful and their assessment authentic. Teachers can use the podcast to bring cultural and social influences into the classroom to support cognitive development as learners seek to make sense of the world around them (Department of Education and Training, Government of Western Australia, http://www.det.wa.edu.au/education/cmis/eval/curriculum/ict/podcasts/, 2008).

Possible uses. Podcasts can be created from original audio recording by students in the classroom or existing audio can be incorporated into the podcast. A podcast can be used to record just-in-time activities such as the exploration of a habitat. Students can use the audio tools to archive their oral account of an event, a book, or even an imaginary tale.

Resources.

- Web Tools for Kids: Music and Podcast https://sites.google.com/site/webtoolsbox/music-tools
- Kid-Cast http://kid-cast.com/
- Podcasting for Kids http://www.podcastingnews.com/content/2009/12/podcasting-for-kids/
- Earth and Sky http:// www.earthsky.org

Summary

Blending environmental and technology literacy into the existing curriculum will help early childhood educators prepare young children to be active, civic-minded adults. We recognize that children come from diverse backgrounds that may restrict their access to the technology and their world beyond their classroom. As 21st century educators, it is our charge to find strategies that level the educational playing field for all learners. Using age-appropriate, interactive technology tools to foster student engagement in activities that support appreciation of the environment and natural resources promotes understanding of environmental issues. Across the nation schools are increasing access to technologies in the classroom. Therefore, providing educators of young children with developmentally appropriate resources and strategies that support environmental and technology literacy should be an essential component of all technology plans.

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Growing Up WILD: Teaching Environmental Education in Early Childhood

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A growing body of research, both nationally and internationally, indicates that children in the early childhood years (birth to age 8) learn primarily through their senses and from direct experience. They develop an understanding about the world through play, exploration, and creative activities as well as by watching and imitating adults and other children. *Growing Up WILD* (2010) is a large format book that promotes teacher efficacy with 27 developmentally appropriate activities, yet gives educators the flexibility to modify activities to meet the needs of children at different age levels and learning stages. The authors describe the contents of the resource as it presents a wide range of options for a variety of classroom strategies: small group, whole group, centers, pair and individual work, plus teachable moments that encourage child-initiated learning experiences. Activities allow opportunities for learning through play by integrating environmental science with literacy, math, and art. Social, emotional, physical, language, and cognitive domains are involved as students participate in hands-on experiences that are particularly effective in early childhood settings. Included in the article is a summary of activities that align with the NAAEE guidelines for teaching environmental education concepts, as well as the Early Childhood Environmental Education Programs: Guidelines for Excellence, and addresses the Head Start Outcomes.

Keywords: early childhood, teacher professional development, environmental education, curriculum integration

International experts concur that this is an important timeframe for learning about environmental science. Karen Hodgkinson, a primary school science teacher in the United Kingdom, suggests "a quality early experience of science in the primary years is the best support for a more in-depth scientific understanding in later years" (Association for Science Education, 2006). Furthermore, Jonathon Porrit, Director of Forum for the Future and Chair of the UK Sustainable Development Commission, states that children with science knowledge can be very effective in helping their parents become aware of their own environmental responsibilities. These ideas support intergenerational learning advocated by the Jane Goodall Institute (2013) that has started *Roots and Shoots* networks in more than 120 countries. Through *Roots and Shoots*, tens of thousands of people from young children to grandparents share their desires to create a better world by identifying problems in their communities and taking action.

Other countries are also experimenting with outdoor environmental projects. One example is "Learning About Soil with Tiptop and His Friends," sponsored by the Technological Research Council of Turkey (TUBITAK) Schools of Nature and Science, with a goal of using group activities that teach concepts related to soil conservation to children between the ages of 5 and 6. The project was comprised of 180 children (90 in the control group and 90 in the experimental group). Results of the study indicated that the soil-related knowledge scores of children in the experimental group of the project increased significantly in comparison to the children in the control group (Ogelman, 2012).

What sparked this interest?

A growing body of research indicates that young children learn in ways that are markedly different than older children and adults (e.g. Pretty et al., 2009). Children in their early childhood years learn primarily through their senses and from direct experience. From birth to five years old, attachment, security, and nurture are most important. The parental sphere of influence is dominant and so relations between authority and the child are vital for children's development. These needs are filled not only by parents but also from interactions with early childhood educators.

Although early memories may begin at birth, during the "second age" of childhood, from 6 to 11 years, children develop more complete memories. These may be woven into continuous narratives such as a story or an account of events. By that age children begin to explore their environment outside the parental sphere of control and develop cognitive capacities. In *Children and Nature Connections*, Charles et al. (2009a) report the importance of reconnecting children to the natural world and state, "Beyond programs and legislation, our ultimate goal is deep cultural change, connecting children to nature, so that they can be happier, healthier and smarter." Some early childhood children are in the social care system and they must also develop attachments to place as well as connections to people. This 'sense of place' can be fostered by learning in nature, an important concept for understanding the methods and theory that support *Growing Up WILD*, the latest book from Project WILD. Furthermore, one of the essential

underpinnings of the NAAEE's early childhood environmental education guidelines is the importance of where one lives. This emphasizes the value in children knowing their own habitat or nature in their local environment.

Growing Up WILD is a large-format teaching resource appropriate for formal and informal settings with young children who are developing their own understanding about the world through play and creative explorations. Twenty-seven activities promote respect for the world and other people and endeavor to form attitudes and habits that young children can follow throughout their lives. This guide is an environmental education book for young children evaluated extensively in the report "Building Capacity for Early Childhood Education with Diverse Audience" (Heimlich & Youngs, 2012). Russo (2001) explains that the rationale behind the project encourages early experiences that can be very powerful in shaping positive attitudes in young people towards the environment. The book supports the NAAEE guidelines for teaching environmental education (2012), as well as the NAAEE's *Early Childhood Environmental Education Programs: Guidelines for Excellence* (2010). It also addresses the Head Start Outcomes (2010).

Growing Up WILD's teaching activities present a wide range of options so that children can work and learn at developmental levels that are individually appropriate. The guide uses a variety of teaching strategies - small group, whole group, centers, pair and individual work, and teachable moments -that allow the teacher to choose what is appropriate for each child and situation. Every activity includes sections to encourage environmental awareness. Because young children are sensory learners, several of the activities involve children directly exploring nature. Knowing this, it is important to note that information provided by adults for children must be done so within the context of hands-on experiences to be impactful in the early years.

These early hands-on experiences make the information that adults wish to impart much more meaningful. Each activity has "Standards and Correlations," "Resources," and "Websites." The book also features "Quick Facts," "Wild Wonderful Words," "Materials and Prep," "Warm Up Procedures" and "Wrap-Up." Richard Louv, in his book *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (2008), highly recommends engaging children with nature. The *Growing Up WILD* activities support Louv's reasoning and, importantly, coordinate well with the NAAEE's *Guidelines for Early Childhood Environmental Guidelines for Excellence*.

Beyond the basic lesson plans, special sections include "Take Me Outside," "Healthy Me," "Helping Hands," "Mighty Math," "Home Connections," "Art Projects," "Music and Movement," "Centers and Extensions" and "Snacks." Both child-initiated and teacher-initiated learning experiences give children opportunities to select among rich choices such as learning through play, particularly in the "Take Me Outside" and "Centers & Extensions" components. All of the activities integrate the content areas - literacy, math, science, and the arts - and involve social, emotional, physical, language, and cognitive domains, helping to foster development and learning in all areas. These components of

Growing Up WILD confirm another ECEE essential underpinning that environmental education be integrated and infused in learning rather than a separate activity or "subject."

Growing Up WILD correlates with NAAEE's *Environmental Education Materials: Guidelines for Excellence* (2009). This document provides a set of recommendations for developing and selecting environmental education instructional materials including: (1) Fairness and accuracy, (2) Depth, (3) Emphasis on skills building, (4) Action orientation, (5) Instructional orientation, and (6) Usability. Many of these NAAEE recommendations are fulfilled by *Growing Up WILD* and three activities will be described to illustrate the versatility of the book.

The initial highlighted activity is called "First Impressions." According to Wilson (1996), introductory experiences during the early years of children's lives promote interest in animals and the environment. This activity addresses the NAAEE guidelines (2010) that animals are presented fairly and with accuracy about their habitats. Looking at pictures of animals, children explore their impressions, feelings, and knowledge appropriate for their age. "First Impressions" needs only simple materials using animal cutouts, which are provided. The children indicate their first feelings about animals by holding up a sign that shows a "smiley" face on one side and a "frowny" face on the other side. For example, Native American children may see snakes and eagles in a positive light from their cultural perspective as opposed to some urban children who may fear them. It is important that teachers collect the responses to make a large group graph so that even young children can begin to discuss the results using mathematical language (Florida Department of Education, 2010).

Classification skills are important to nurture during the primary grades for future problem solving and mathematical thinking. An extension for "First Impressions" is to have young children place colored pictures of animals from magazines on a two-column chart to differentiate, for example, pet-store animals from other domestic animals or domestic animals from those that live in the wild. The NAAEE's early childhood guidelines relate to this activity as it emphasizes authentic experiences. Teachers can bring in live animals such as a rabbit or gerbil. Better yet, go outside to capture a grasshopper in a plastic box with holes allowing children to see this arthropod's movements from all sides before discussing why we should release this animal back to the wild. This kind of thinking may lead to an organized field trip to the zoo to spark children's curiosity and questioning. With teacher implementation, "First Impressions" progresses from simple cutouts to recognize animals, to seeing pictures of animals in their habitats, to visiting animals in the zoo or simply in the schoolyard neighborhood.

Three special sections complement "First Impressions." "Snacks" asks students to put together edible animals such as snakes, spiders, earthworms, and ants-on-a-log. These kinesthetic activities help young children think about the shapes of various animals and discuss body parts such as how many legs. "Helping Hands" inculcates respect when

approaching animals such as pets or wild animals. This focus on manners can extend to empathy for the feelings of the shy child or the bully in the classroom or when reacting to someone who says they are afraid of an animal or situation. "Centers and Extensions" give teachers an opportunity to allow students free choices to pursue an interest in their favorite animal. This may lead to an appreciation and sense of wonder for nature and animals that is important to nurture in young children (Wilson, 1993). This is vital because environmental education in early childhood should be based primarily on free discovery with the key goal of facilitating positive direct experiences in nature.

"First Impressions" can be scaffolded to accommodate a variety of developmental levels of learners through the animal cutout, middle range children with the pictures and discussion. Some students might go on to another activity from *Growing Up WILD,* such as "Ants on Parade" (pp. 12-13). This activity is compatible with "Understanding an Anthill," another developmentally appropriate, child-centered, outdoor exploratory activity that is highlighted in the NAAEE's early childhood environmental education guidelines. Both experiences can include children collecting food for ants, forming hypotheses about their food preferences, and then closely observing and graphing ant behavior. Table 1 correlates "First Impressions" with both Head Start Outcomes and the NAAEE guidelines for environmental education materials, as well as NAAEE's early childhood environmental education guidelines.

A second activity from *Growing Up WILD* is "Oh Deer." The goal of this activity is stated in the section called "Quick Facts." It states, "All animals need food, water, shelter and space. Each species or kind of animal has specific requirements for these survival needs." In this activity the main focus is deer. These herbivores are widespread throughout North America and the world's varied environments such as forests, deserts, plains, swamps, prairies, farmlands and suburban areas. Deer headbands are provided for the students as visual clues associated with the concepts of food, water, and shelter; the essential component space is assumed. After each round of the game, the students count and record on a large classroom graph the number of deer at the beginning and the number of surviving deer at the end of each round. The graph becomes a visual reminder of what they experienced during the activity. This group activity lends itself extremely well to teaching English language learners (ELLs). Children can progress in listening to and understanding English while they play a game explaining deer populations. ELL students may not understand conceptual words like "habitat" right away, but they can compare how many and make sense of the number of deer increasing and decreasing while participating in this group activity. This also helps build a cultural bridge through shared experiences with other children. The learning experiences increase the children's vocabulary as they learn first-hand words such as alive, recycled, and habitat in addition to helping them learn important concepts about animals and the environment (Petrash, 1992).

"Oh Deer" relates to the NAAEE guideline about depth of knowledge as the concept of varying deer populations is learned in the context of a game for children in primary

grades. For younger children the “Take Me Outside” suggestion is for children to imagine they are deer living in their center playground and explore ideas related to their habitat needs. The simple song called “Where’s the Habitat?” has repetitive words to help second language learners imitate animal movement, and allows active early childhood learners to exercise, while they develop understandings of personal space, and reduce stress through rhythmic movement.

The "Healthy Me” special section of “Oh Deer” takes this game to a personal level as students figure out needs in their own habitat. A paper divided into four sections represents their own habitat as they cut out or draw representations of the essential components: food, water, shelter and space. They make a simple drawing of their home, showing their kitchen for food, their bathroom for water, their own bedroom as personal shelter and the living room for common space. This activity is most meaningful and appropriate for primary grad children rather than preschool. Table 2 depicts the various components of this activity.

A third activity from *Growing Up WILD* deals with understanding the needs of a particular animal in its habitat. The “Deep Blue Sea” activity enlarges the idea of the environment to help children who do not live by the ocean experience the concept of salty water. To emphasize how much water on earth is salt water, the teacher tosses a blow-up plastic globe into a circle of children who are instructed to catch it with only two fingers. Once again, the teacher helps students collect data by counting the results of land, fresh water or oceans. This helps the children understand that much of our planet is salt water. The Special Sections “Mighty Math” teaches classification skills when students compare and sort seashells which is an opportunity for young pre-school children to manipulate natural materials. In “Music and Movement” students move as ocean animals to the song “Did You Ever See a Sea Animal?”

As a wrap-up, students create a whole-group collage or mural of the ocean life they might observe during an imaginary sail on the back of a whale. Working with an adult, older students identify the sea animal that they choose to include in the whole class collage and tell others if it was a real or imaginary, and the ocean depth and habitat it prefers. Concepts of number and operations are enhanced when teachers ask students to tell how many sea creatures they found when they finish their collage. Together they can compare, sort, and count the number of different sea animals found by the class as well as estimate how many they think might be in all the oceans on earth.

“Deep Blue Sea” concludes with “Home Connections” which gives parents and guardians ideas to continue the learning with activities such as setting up an aquarium or visiting a pet store. The last suggestion correlates with the NAAEE Guidelines for Action to promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for action. Table 3 outlines the specifics of this activity, however this activity can be scaled up or down. The youngest children can experience salt and fresh water. Middle range children can become very creative with

their mural; older and gifted children can make full use of the learning resources provided by the aquarium or create their own pet store.

CONCLUSION

The early childhood book *Growing Up WILD* (Council for Environmental Education, 2010), adheres to the founding philosophy of Project Wild to teach children not what to think, but how to think. The activities can help children understand how to handle challenges and problems more successfully, act responsibly toward each other and the earth, be more physically active and aware of their personal needs and those of others, and have a greater appreciation for arts, music, history and literature (Council for Environmental Education, 2010, p. 4). Environmental science experiences promote an appreciation for animals and the environment, as well as enrich vocabulary through beginning literacy and math skills. These suggested experiences in nature and with natural materials help foster young children's curiosity while rooting them in the real natural world. The activities correlate with the Head Start Child Outcomes Framework developed by the U.S. Department of Health and Human Services to identify a framework of domains and indicators for child development. As well, the activities demonstrate the six principles for NAAEE's *Environmental Education Materials: Guidelines for Excellence*. The three *Growing Up WILD* activities highlighted in this article contain a plethora of ideas, concepts and extensions to inspire teachers and their students to continue with further explorations. This program is backed by research from the 2012 Institute for Learning Innovation which undertook a meta-analysis entitled, "Building Capacity of Early Childhood with Diverse Audiences: Growing UP WILD. During the grant period, 1,911 educators were trained and in turn reached 1,220 children directly and many more through the extended training efforts. The research summary stated: "*Growing Up WILD* appears to be a program with an applicable training program using excellent materials that has a strong return on investment."

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Table 1
"First Impressions"

Curricular Foci	Head Start Outcomes	Performance Objectives	Descriptions	Special Features	NAAEE Guidelines for EE Materials	Early Childhood EE: Guidelines for Excellence
Language Development	Speaking and Communication	Progresses in abilities to initiate and respond appropriately in conversations and discussions with peers and adults	Discusses real and imaginary animals	"Snacks" discusses healthy food while making design one can eat such as "Ants-on-a-Log."	1. Fairness and accuracy: EE materials should be fair and accurate in describing environmental conditions, problems, and issues, and in reflecting diversity of perspectives on them.	1.2 Focus on education of young children
	Speaking and Communication	Uses increasingly complex and varied spoken vocabulary	Vocabulary and classification		1.3 Openness to inquiry	1.3 Culturally appropriate goals, objectives and practices.
Literacy	Book Knowledge and Appreciation	Shows growing interest and involvement in listening to and discussing a variety of text	Distinguishes real and fictional animals	"Centers and Extension" Library collection of books and poetry	1.1 Factual Accuracy 1.2 Balanced presentation of differing viewpoints and theories	1.1 Focus on nature and the environment.
	Early Writing	Develops understanding that writing is a	Group write a real story and then a		6. Usability: EE materials should be well designed and easy to use.	4.5 Curiosity and questioning

		way of communicating for a variety of purposes	fictional story about the same animal			
Creative Arts	Dramatic Play	Shows creativity and imagination in dramatic play situations	Re-enacts stories of real animals in their habitat		6.5 Accompanied by instruction and support	3.2 Play and role of adults
Approaches to Learning	Initiative and Curiosity	Develops increased ability to make independent choices	Argue why an animal is wild or domestic	"Helping Hands" manner with animals.	1.4 Reflection of diversity	6.4 Planning and implementing environmental education

Table 2
"Oh Deer!"

Curricular Foci	Head Start Outcomes	Performance Objectives	Description	Special Features	NAAEE Guidelines for EE Materials	Early Childhood EE: Guidelines for Excellence
Science	Scientific Knowledge	Expands knowledge of and abilities to observe, describe, and discuss the natural world, and processes.	Plays game using signs for food, water and shelter	"Healthy Me" needs for my healthy environment: Picture of home	2. Depth: EE materials should foster an understanding and appreciation of environmental concepts, conditions, and issues as appropriate for different developmental levels.	5.6 Environmental Sustainability
Language Development	Listening and Understanding	For ELL children, progresses in English comprehension	Plays game with simple rules	"Music and Movement" as students imitate the animal movements	2.2 Concepts in context	4.4 Skills for understanding the environment
Physical Health and Development	Fine Motor Skills	Grows in hand-eye coordination in reproducing shapes and	Wear headbands provided from the		5. Instructional orientation: EE materials should rely on instructional	5.1 Spaces and places to enhance development

		patterns using scissors	student pages		techniques that create effective learning.	
	Gross Motor Skills	Shows increasing levels of proficiency, control, and balance in movement	Move as deer and consider how do larger and smaller animals move	"Take Me Outside" Where students move like a deer in habitat	2.3 Attention to different scales 5.7 Appropriateness for specific learning settings	5.5 Health, safety and risk
Mathematics	Numbers and Operations	Begins to use language to compare numbers of objects with terms such as more, less, r greater than, fewer, and equal to	Counts the number of deer that survive each round of play		3. Emphasis on skills building 4. Action orientation: EE materials should promote civic responsibility 5.8 Assessment	6.6 Assessment and evaluation

Table 3
"The Deep Blue Sea"

Curricular Foci	Head Start Outcomes	Performance Objectives	Description	Special Features	NAAEE Guidelines for EE Materials	Early Childhood EE: Guidelines for Excellence
Science	Scientific Skills and Methods	Develops increased ability to observe and discuss common properties, differences, and comparisons among and between objects and materials	Observing various seashells	"Home Connections" Set up an aquarium or visit a pet store	1.Fairness and accuracy 1.1 Factual accuracy	2.1 Based on research and theory
	Scientific Knowledge	Expands knowledge of their environment	Tastes salty and fresh water	Set up an aquarium at home or visit a pet store	5. Instructional Orientation 5.2 Different ways of Learning	1. Child directed and inquiry-based
Language Development	Listening and Understanding	Demonstrates increasing ability to attend to and understand stories, songs, poems, and conversations.	Poetry extensions		4. Action Orientation 4.2 Self-efficacy	4.5. A personal sense of responsibility and caring
Mathematics	Patterns and Measurement	Shows increasing abilities to match, sort and regroup objects according to one or two attributes such as shape or size.	Sorts shells	"Mighty Math" comparing seashells	2. Depth 2.3 attention to different scales	1.6 Ongoing evaluation and assessment
Creative Arts	Art	Begins to understand and share opinions about artistic products and experiments	Group mural with ocean plants and animals	"Music and Movement" Move to the song "Did you	3.Emphasis on Skill Building 3.1 Critical and Creative thinking	6.5 Fostering Learning

				Ever See a Sea Animal?"		
Approaches to Learning	Engagement and Persistence	Shows growing capacity to maintain concentration over time on a task, questions, set of directions, or interactions despite distractions and interruptions	The mural will take several days time.		4. Action Orientation 4.1 sense of personal stake and responsibility	6.1 Foundations for early childhood environmental education

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Editors' Review of *Research in Early Childhood Education for Sustainability: International Perspectives and Provocations*

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Mounting concerns about climate change and unsustainable development, and their current and future impacts on all of us – but particularly on children - provided the impetus for this book. Then, as researchers in early childhood education (ECE) and/or education for sustainability (EfS), we used these concerns to shape and question our thinking. This first-ever research text in Early Childhood Education for Sustainability (ECEfS) was advanced when the chapter authors, almost all of whom participated in one or both *Transnational Dialogues in Research in Early Childhood Education for Sustainability* (Stavanger, Norway, 2010, and Brisbane, Australia, 2011) met for the first time - a critical mass of researchers from vastly different parts of the globe - Norway, Sweden, Australia and New Zealand at the inaugural meeting, with participants from Korea, Japan and Singapore attending the second. We came together to debate, discuss and share ideas about research and theory in the emerging field of ECEfS. An agreed-upon outcome of the Dialogues was this text.

Rationale

The overall purpose of the Transnational Dialogues and this text was to fill the research gap in ECEfS. Elsewhere, we have identified that research in this field has been very limited. Our belief is that early childhood practitioners - the main advocates for EfS - have had little research evidence to guide practices in this new pedagogical space. ECEfS is NOT the same as school EfS. We wanted to ensure that what was emerging in both practice and research reflected the specialness of EC, so that educators could relate to and contribute fully to the educational transformations that lie at the heart of ECEfS. Further,

we wanted to provoke early childhood education researchers - well, at least a few! - to focus on this emerging area. We believe this text achieves these two goals.

It is important to emphasize that the text is not simply a compilation of what is happening in ECEfS generally. The Dialogues and the text have a particular orientation – exploration of ECEfS from the perspective of young children as central - as thinkers, problem-solvers and agents of change for sustainability. We were not interested, for example, in researching nature education/outdoor education - although we appreciate their value - except as these approaches support or may hinder children's capabilities to engage in sustainability issues and topics. The approach to ECEfS, and therefore the research promoted in this text, is of children working authentically to explore sustainability topics/issues of interest to them, while working alongside teachers, families and communities in solving problems, seeking solutions and taking actions that 'make a difference', mostly within their local context, but occasionally on a bigger stage. The contributing researchers have clearly articulated their support for this orientation through their individual chapters.

Profiling the chapter authors

The Dialogues participants included experienced, mid-career, and early career researchers, those underway with doctoral studies or yet to commence. The varied levels of research expertise and experience are reflected in the chapters. A number of contributions take a strongly philosophical and theoretical lens to topics concerning young children and EfS. Most, however, focus on observations, analysis and critical reflections of practitioner curriculum and pedagogical approaches. Like Hart (2002), we consider practitioner research as 'knowing that comes from within the action' (p.146) and, as researchers, we are 'exploring the possibilities of theorizing with [teacher] stories instead of about them' (p.155). At the same time, we acknowledge that this practitioner focus is evidence of a nascent field where it is practitioners, rather than theorists and researchers, who have driven the uptake of ECEfS. Now, however, we believe it is time to turn a more scholarly eye to what is being enacted and to explore approaches and practices more deeply and critically. Hence, we see this text as evidence that the field, more generally, is beginning to mature.

SUMMARIES OF CHAPTERS

Foreword – Daniella Tilbury, United Kingdom

Here, Professor Tilbury emphasises the value of this text in bringing together the fields of early childhood education and education for sustainability. She highlights the importance of the book's stance in profiling both international research perspectives and diverse research approaches. She identifies that the focus on children as having agency, and the

imperative of families and communities being engaged in ECEfS, as offering important contributions to EfS more broadly.

Introduction – Framing the text – Julie Davis and Sue Elliott, Australia (co-editors)

In this introduction, the co-editors outline their rationale for the text, primarily to 'fill the gap' in research in ECEfS. They provide an overview and critique of the chapters as a collection, emphasising the importance of international perspectives and a multiplicity of research orientations to this emerging field of enquiry. The co-editors identify three clusters in the research chapters: 1. three chapters focused on values and ethics; 2. four chapters representing historical threads and a range of sociocultural contexts in ECEfS, and 3. eleven chapters focused on curriculum and pedagogy.

Chapter 1 – Revisioning rights – Julie Davis, Australia

In this first chapter in Cluster 1, co-editor Davis calls for rethinking the rights base of early childhood education (ECE) which, to date, has relied on the United Nations Convention on the Rights of the Child (UNCRC) (UNICEF, 1989). She argues that while the UNCRC still serves an aspirational purpose, it offers too narrow a concept of rights for enacting ECE in the 21st century given the challenges of sustainability. She proposes a 5-dimensional approach to rights that supports the foundational rights of children as espoused in the UNCRC, and the call for agentic rights as advocated more recently by many early childhood academics and practitioners, as well as rights that acknowledge communitarianism (We are all in this together), intergenerational rights (Our legacy to our children and grandchildren), and bio/ecocentric rights (non-human species and environments have rights).

Chapter 2 – Value conflicts and children's rights – Solveig Hagglund and Eva Johansson, Sweden

The Swedish authors of this chapter elaborate a view of EfS as a matter of human – and hence of children's - rights. They draw on theoretical concepts and models within childhood sociology, in particular its conceptualization of how societal and generational aspects of childhood restrict and limit children's possibilities to participate in society, and from conflict theory that opens up a perspective that value conflicts are inevitable when approaching sustainability as a democratic human right. They draw on Nordic research to offer responses to the power issues that arise when discussing sustainability and education, and provoke readers with questions and challenges when learning for sustainability is to be enacted within early childhood education.

Chapter 3 – Learning from the wisdom of elders – Jenny Ritchie, Aotearoa, New Zealand

This researcher offers a series of provocations - coming from a critical, place-based orientation - about ways that EC educators might develop relationships with Indigenous peoples, in order to strengthen the Indigenous understandings that they seek to incorporate within programs. Dialogical interaction with Indigenous peoples and with the local place is seen as a source for interpreting ways of caring deeply for our planet, positioning humans alongside local ecologies as 'co-habitors' of the earth. The chapter provides research examples that illustrate some of the ways these notions have been applied within early childhood care and education programs in Aotearoa, New Zealand.

Chapter 4 – Embedding Indigenous perspectives – Melinda Miller, Australia

In this first chapter in Cluster 2, the author discusses embedding Indigenous perspectives in ECEfS and how this can uphold social and political action goals that support a holistic approach to promoting sustainability in EC contexts. The chapter explores how intercultural dialogues and priorities can foreground broader themes of sustainability that attend to local issues around culture, diversity and equity in relations between groups of people. The author emphasises that strengthening intercultural priorities in ECEfS requires a commitment to reflective practices that accord the influence of one's own cultural background on teaching and learning processes.

Chapter 5 – Perspectives on ECEFS in Japan - Michiko Inoue, Japan

This researcher notes that Japan has a long history of early childhood education beginning in the 19th century, and that environmental education was first introduced into the national curriculum in 1980s. However, both streams, early childhood education and environmental education, have never been combined into a field such as ECEfS. She then outlines analyses of official guidelines and the work of academics and educators that demonstrate limited concern for environmental education in early childhood education and discusses the necessity for rethinking early childhood education in Japan in light of sustainability challenges. She concludes by discussing the need to consider the diverse cultural contexts into which EfS must fit if an international movement is to become effective.

Chapter 6 - Building a sustainable nation in Singapore – Hui-Ling Chua, Singapore

This researcher begins by outlining Singapore's necessity for its *National Green Plan* that includes delivery of environmental education, for the long-term survival and the wellbeing of its people. She comments, however, that environmental education programs targeted at early childhood are few. This chapter provokes consideration of how the ECE community may emerge as a strong partner in the building of Singapore as a sustainable nation. However, she offers that a critical reading of current policies and curriculum

guidelines, together with her research findings indicates that the implementation of ECEfS in Singapore is problematic. The chapter concludes with a summary of actions and a call to the early childhood community to acknowledge ECEfS in professional practice.

Chapter 7 – Norwegian perspectives on ECEfS – Barbara Sageidet, Norway

This researcher identifies that ideas about sustainability have long been part of Norwegian public thinking and that the National Framework for early childhood education broadly recognises sustainability as part of the content area 'Nature, Environment and the Techniques', but that little is actually known about the role of EfS in the everyday life of kindergartens. The chapter offers insights into ECEfS in Norway, and discusses challenges and possibilities related to ECEfS, based on literature studies and an interview with an experienced Norwegian environmentalist.

Chapter 8 – Researching change and theorising about interfaces – Sue Elliott, Australia

In this first chapter of Cluster 3, co-editor Elliott discusses how implementation of ECEfS is often explicitly linked with natural playspaces in early childhood settings, but she questions just how well such playspaces offer contexts for ECEfS. The research project on which this chapter is based involved Critical Participatory Action Research with two Australian case study early childhood centres. In an attempt to better understand the natural outdoor playspace as a context for ECEfS, a theoretical framework is proposed informed by Sterling's (2001) nested systems theory. The chapter identifies that getting started with sustainable practices may provoke educators to think and act differently not only about sustainability, but also about early childhood pedagogy and philosophy.

Chapter 9 – An AuSSi EC adventure – Tracy Young & Amy Cutter-Mackenzie, Australia

These two Australian researchers worked with the school-based Australian Sustainable Schools Initiative (AuSSI) as a framework for implementing ECEfS. Their chapter reports on findings of the Sustainable Early Childhood Project (SECP) in which four Australian children's services and an early childhood education researcher implemented an early childhood version of AuSSI that saw early childhood educators and researchers proactively adapting and implementing AuSSI. The chapter offers insights into what AuSSI might look like in early childhood settings with the discussion centred on the theme of community engagement.

Chapter 10 - The Project Approach in ECEfS: Exemplars from Korea and Australia - Okjong Ji, Korea, and Sharon Stuhmcke, Australia

This chapter presents two case studies about young children participating in EfS projects in Korea and Australia. Both are adaptations of the Project Approach (Katz and Chard, 2000) which encourages lengthy exploration of topics and themes, and supports deep

learner engagement. The projects outlined in this chapter synthesize constructivism and co-constructivism with transformative teaching and learning, drawn from EfS. The result is a transformative project approach where young children demonstrate problem-solving and leadership within their local communities to create and implement sustainable practices.

Chapter 11 - Valuing agency in young children - Glynne Mackey, Aotearoa New Zealand

This chapter investigates how the early childhood curriculum might confront sustainability and how teachers are searching for ways to create a culture that embraces meaningful and transformative experiences that may empower children. The research data from teachers explores the challenges, and successes involved in establishing sustainability programs, while the data from children demonstrated their sustainability understandings and active participation. The teachers' conversations and reflections revealed how they valued young children's agency, and how this contributed to creating centre cultures of sustainability.

Chapter 12 - I want to do real things - Louise Phillips, Australia

Framed within communitarianism, this chapter explores possibilities for young children's active participation in sustainability. Two research studies are offered; one explored a living theory of storytelling pedagogy, whilst another investigated the scope of public pedagogy to cultivate shifts in social perceptions of children and citizenship. Data from both studies demonstrated that children wanted to be active citizens. The ideas discussed alert educators, policy makers and community workers to the complexities that surround notions of young children's active citizenship and provide guidelines for young children's inclusion in civic participation for sustainability.

Chapter 13 - EfS in Swedish preschools - Ingrid Engdahl and Eva Ärlemalm-Hagsér, Sweden

The chapter authors share their understandings of EfS in Swedish preschools by reviewing research in this emerging field, and then offer a discussion about EfS projects in Swedish preschools. In particular, a recent international OMEP project is cited. Insights into high quality EfS pedagogy are evident, along with provocations for the field to stimulate deeper thinking about EfS in early childhood education. The authors question, *Are Swedish preschool teachers 'stepping out or out of step' with respect to sustainability*?

Chapter 14 - Innovative approaches to ECEfS in England - Robert Barratt, Elisabeth Barratt-Hacking, and Pat Black, UK

The authors argue that free play in natural environments, provides the foundations for ECEfS, yet current early years policy negates such opportunities for young children in

England. Four case studies of early year's settings are used to illustrate ECEfS approaches. An analysis of documentation and external inspection reports found four distinctive approaches to EfS including: (1) sustained authentic outdoor play; (2) place-based learning; (3) free play and risk-taking in the outdoors; and (4) participation in developing a sustainable school curriculum. For each case study there was evidence of the positive impact of EfS on children's learning.

Chapter 15 - ECEfS in the USA - Louise Chawla and Mary Rivkin, USA

Research on significant life experiences in the development of active care for the environment indicates the importance of extended free play in nature in early childhood, and adults who encourage appreciation for the natural world. Ecological psychology provides a framework for understanding these research outcomes, and highlights the importance of children having opportunities to assume responsible roles in their communities, including collective environmental action. Initiatives in the USA which illustrate these components of EfS, including nature-based preschools, forest kindergartens, Green Schools and community-wide partnerships to integrate children into actions for sustainability are outlined.

Chapter 16 - The Arts and EfS - Lyndal O'Gorman, Australia

This chapter explores how integration of the Arts and EfS can provide expanded opportunities for seeing, understanding and responding to the sustainability imperative. Such approaches encourage broad engagement and expression of ideas about sustainability beyond the languages of the Sciences and Geography. Traditionally, the Arts have been valued highly by the ECE field and increasing engagement with the sustainability suggests that teachers might find ways to integrate ECEfS with the Arts in meaningful ways. This chapter explores how an integrated Arts and Humanities subject in an ECE teacher education course provided a context for the integration of sustainability as a cross-curricular thread.

Chapter 17 - Science in preschool – a foundation for EfS? - Bodil Sundberg and Christina Ottander, Sweden

The authors elaborate on how science encounters in preschool are a means of empowering children to engage with sustainability. Recent research has argued for a shift from viewing science in preschool as mainly nature experiences, towards science inquiry. By doing so, the interplay between knowledge, values and the ways in which humans build and make use of new knowledge can become visible, thus laying a foundation for EfS. Implementation of science inquiry processes in preschools necessitates changes in preschool teachers' personal and professional views of science, nature and pedagogy. In this research, how competency in inquiry-based teaching may, or may not, develop during pre-service preschool teacher education was investigated.

Chapter 18 – ECEfS in the United Kingdom - Louise Gilbert, Mary Fuller, Sally Palmer, and Janet Rose, United Kingdom

This chapter reviews the ways in which higher education can engender professional capital to facilitate and normalize a 'culture of sustainability' in the early years. Two recent studies demonstrate the transformative effect that active engagement with a variety of sustainability issues can have on the development of practitioners' professional capital, and how this can be translated into the promotion and implementation of ECEfS. In seeking to promote transformative mind-sets, opportunities were created for practitioners to become agents of change and the - as influential role-models - to empower children to contribute actively to sustainable futures.

Chapter 19 - Expanding worlds of ECEfS - Ann Farrell and Susan Danby, Australia

Transnational Dialogues in ECEfS represent a confluence of two globally-significant fields of research and practice: ECE and EfS at a critical time for young children and their worlds. This concluding chapter is framed around looking backwards to the international prioritising of agendas for both sustainability and ECE and looking forwards to new priorities in research and practice to ensure that young children, both now and in the future, are participatory, ethical and sustainable.

WHAT NEEDS FURTHER ATTENTION IN ECEfS RESEARCH

This publication as a first-ever ECEfS research text offers an opportunity to pause and reflect amidst the celebration of an important milestone. We offer the following questions to guide the next phases of this journey into ECEfS research: *Why has it taken so long to reach this milestone in ECE given the dire state of the Earth? How can the missing research voices be heard from countries and regions where, often, the ecological foot print is least? What theoretical frames and methodologies beyond this initial publication offer scope for investigation of EfS in early childhood contexts? How can we build and strengthen an international research community in ECEfS to consolidate the place of early childhood within the broader EfS research field? What synergies might transpire when early childhood is equally recognised within the current suite of EfS research?*

CONCLUDING COMMENTS ABOUT THIS RESEARCH TEXT

This publication is only the first step in bringing ECEfS research to a wider audience. In sustainability, one must start with small steps to 'make a difference'. However, it is past the time for everyone to be much bolder if we are to address our century's challenges. We invite researchers and practitioners to action change in their spheres of influence, and beyond, for a sustainable future for ourselves, our children and future generations.

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Children, Youth and Environments (CYE) Announces a Special Issue on Greening Early Childhood Education

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University of Maine at Farmington

Nancy Rosenow
Nature Explore/Dimensions Educational Research Foundation

A special issue of *Children, Youth and Environments* (CYE) on Greening Early Childhood Education has just recently been published. The special issue can be accessed at www.jstor.org/page/**journal**/chilyoutenvi/about.html**.**

Overview of the Issue

The collection of papers contained in this special issue was elicited by a worldwide call for papers to explore settings that provided nature experiences for young children, with attention given to the effects that these initiatives have on the holistic development and environmental awareness of the children, as well as impacts on the teachers and staff involved. More than two dozen abstracts were received, of which eleven articles were chosen. These included seven research articles, three reports from the field, and one personal voice essay. These papers reflected diverse methods of connecting children with nature and the articles fell into several categories including a literature review on the benefits of children's engagement with nature; natural outdoor play spaces; nature preschools and forest kindergartens; and the connection between nature and children's holistic development. In addition, five books reviews, one movie review, and a mention of other publications of note completed the issue.

Literature review

The issue begins with a piece by researcher Tim Gill, providing a systematic literature review of much that has been written about the ways children benefit

when engaged with nature.

Natural outdoor play spaces

A pilot post-occupancy study by landscape architecture professor Samuel Dennis and his colleagues examined the extent to which the design of natural outdoor classrooms produced their intended outcomes, and what characteristics of design were most important in bringing about positive results.

Kimberly Drown and Keith Christensen provided an investigation of the contrasts in play affordances offered by natural and manufactured materials in outdoor settings.

Leslie Kochanowski and Victoria Carr explored the relationship between the affordances of natural learning environments and the development of self-determination in children.

A system-wide health promotion strategy, *Preventing Obesity by Design*, that incorporates a naturalization approach to improve the quality of outdoor learning environments at North Carolina childcare settings, is described by Robin Moore and Nilda Cosco.

Nature preschools and forest kindergartens

Nature preschools and forest kindergartens have much in common. However, there are distinct differences between these two approaches. Using a taxonomic metaphor, David Sobel's thoughtful essay distinguishes between the two approaches, suggesting that nature preschools and forest kindergartens are in the same "genus," but two different "species." His piece exemplifies the need for both and provides descriptions of particular programs in the Northeastern United States.

A quickly growing approach to connecting children with nature is forest kindergartens in public schools. Enid Elliot and colleagues provide a look at an innovative nature kindergarten program at a public school in British Columbia where children spend at least half their day outside in all types of weather.

Forest kindergartens that are modeled after programs started in Europe are an approach that is gaining traction in many areas around the world. Children spend 80-90% of their time outside in natural habitats. Transferring this approach from Europe to North America has its challenges. Regina Wolf Fritz and her teachers at the Natick Community Gardens Forest Kindergarten in Massachusetts provide a

keen look at difficulties and opportunities in bringing the Waldkindergarten approach to North America.

Connection between nature and children's holistic development

One of the benefits of connecting children to the natural world is the impact nature has on the whole child. Nature provides the vehicle for an integrated approach to child development. In this issue three articles provide different ways that this can be accomplished.

Nature's role in the spiritual development of children is brought to the forefront with a grounded theory developed by Deborah Schein.

Ellen Hall and her co-authors provide a look at how infants and toddlers connect with nature.

Iris Duhn and Jenny Ritchie connect education sustainability practices in Aotearoa, New Zealand with early childhood programs.

It is encouraging to see the multiple and diverse ways that are emerging for connecting young children with nature. This special issue provides a glimpse of the benefits nature provides for children and society and how even very young children can develop appreciation and care for the natural world.

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The *Natural Start Alliance*: Building Collective Impact for Early Childhood Environmental Education

Christy Merrick
North American Association for Environmental Education, USA

Last year, the North American Association for Environmental Education launched the *Natural Start Alliance*, a new initiative to advance environmental education for infants, toddlers, and preschoolers. One year into this new initiative, we would like to share a number of updates and progress in several key areas, and invite you to join us.

Information and resources

Natural Start launched its website, *NaturalStart.org*, in October 2013. At the site, visitors can find:

- A monthly feature story that explores environmental education themes in depth
- A blog on recent news and ideas from the field
- A member spotlight highlighting Natural Start members
- Upcoming events and professional development opportunities
- A filtered list of early childhood environmental education resources
- A searchable map of Alliance members

Networking opportunities

The Natural Start Alliance has focused on creating more opportunities for the early childhood environmental education field to network and share ideas and resources, including efforts such as:

- Connecting through social media such as Facebook (fb.com/naturalstartalliance), Pinterest (pinterest.com/naturalstart), and Google Groups (groups.google.com/forum/#!forum/natural-start-alliance).
- Support for the Nature-Based Preschool Conference held this year in conjunction with the Association of Nature Center Administrator's Annual Summit, which brought nature-based preschool professionals from across the US and Canada together for professional networking
- Networking events at the 2014 North American Association for Environmental Education Annual Conference and Research Symposium

Connecting to broader initiatives and audiences

Natural Start also participates in advisory groups, other alliances, and collaborations with like-minded organizations in order to build support for early childhood environmental education, including partnerships such as:

- Outdoors Alliance for Kids
- Association of Zoos and Aquariums and Disney's "Nature Play Begins at Your Zoo or Aquarium" Advisory Group
- The World Forum Foundation's Nature Action Collaborative for Children, North American Leadership Team
- Research Advisory Team for the University of Wisconsin-Madison, Dimensions Educational Research Foundation, and Outdoor Classroom Project study of nature-based outdoor learning environments

Coming soon

Natural Start also has several projects in development that will soon be available, including:

- Fact sheets on the benefits of early childhood environmental education, developed in conjunction with Stanford University's Woods Institute for the Environment
- White papers that explore how policies shape early childhood environmental education, and how we can work together as a field to advance our work through policy
- Tools for finding resources related to designing effective, nature-based outdoor learning environments for young children
- A new area of NaturalStart.org that will feature nature preschools

Join the alliance!

Educators, administrators, parents, and professionals in fields from architecture to landscape design to environmental conservation all have a role to play in connecting infants, toddlers, and preschoolers to nature and the environment. Natural Start provides an opportunity for key players to convene, share ideas and resources, and move together toward our shared goals. When organizations join the alliance, they appear on our searchable map of alliance members, helping the field become more visible and connected. Join today at NaturalStart.org to help keep the early childhood environmental education field moving forward.

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CHILDREN'S BOOKS AND RESOURCES REVIEW

Brenda Weiser and Jill Smith, Editors

Each issue of the journal will focus on a theme for children's books, activity guides, and resources. The theme for this issue is "Taking Learning Outdoors". Summer is a great time to take children outdoors and introduce plants and animals. Children can use their five senses to discover what lives around them and how all things interact. Here are few resources that can enhance your teaching during the summer.

Future themes include *All about Fall* where the focus will be on fall events, changing of the seasons, and scary animals. *Winter Wonders* will concentrate on how plants and animals survive along with what you can do for animals in the winter. For the spring, *Gardening with Children* will follow the winter and the emphasis will be getting children outside and planting gardens with them.

Environmental Experiences for Early Childhood

American Forest Foundation, Project Learning Tree

As you open this activity guide, you are quick to notice the introduction, the three themes, and appendices. Each theme, along with the introduction and appendices, are printed on a different color so that it is easy to find.

This activity guide includes 11 activities (over 130 experiences) for those teaching early childhood. Each activity may have several other activities embedded within them. There are three sections, each focusing on a specific theme. Section one addresses the five senses; section two includes an activity for each of the four seasons; and section three stresses the importance of trees. Each activity includes background for educators, how to introduce the theme, the featured experience, group experiences, and ideas for learning centers (art, outdoor play, discovery table, math and manipulatives, woodworking, and dramatic play). In addition, each activity includes a reading and writing connections. Music is an integral part of the activities and an optional CD is available with songs by Billy B. A sidebar is included in each activity that can be used as a quick reference providing an overview, objectives, assessment, word bank, and a list of activities from Project Learning Tree's PreK-8 Environmental Education Activity Guide that can be used to extend and enhance the given activity.

The introduction provides tips on facilitating experiences for early childhood learners, teaching about nature, and learning about forests and trees. Safety in the outdoors, setting up an outdoor classroom, and taking neighborhood walks are a few of the topics found in the appendices.

The activities and the activity guide have been peer reviewed and field tested by early childhood educators (names of the reviewers are included). The guide has been correlated to the national standards for preschool education including the National Association for the Education of Young Children (NAEYC), the North American Association for Environmental Education (NAAEE) Early Childhood Environmental Education Guidelines for Excellence, and the Head Start Childhood Outcomes Framework.

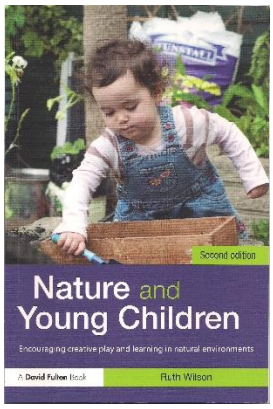
An example of one of the activities is The Shape of Things. Here children learn the shapes as they explore the outdoors using labeled shapes cut from paper. After the students explore their outdoor surroundings and identify shapes, they may come back into the classroom and create and eat fruit kabobs. The fruit is cut into different shapes and the children can identify the shapes as they place each on the kabob.

This activity guide is the *Learning* ® Magazine 2011 Teachers' Choice℠ Award winner.

Participants attend a workshop offered within your state to obtain a copy of this guide. The length of the workshop and cost may vary according to your state and the setting. Contact your state Project Learning Tree coordinator for more information regarding attending or setting up a workshop. The National Project Learning Tree website will have your state contact listed: https://www.plt.org/your-state-project-learning-tree-program

Nature and Young Children, 2nd Edition

By Ruth Wilson



Ruth Wilson has been an educator for over 30 years and writing about nature and children for the past 20 years. She brings both her experience as a teacher and her love for teaching children about nature together in her latest edition of *Nature and Young Children*. So when you first dive into *Nature and Young Children*, you may wonder if this is a book for early childhood practitioners or one for environmental educators. As you begin exploring the eight chapters within the book, you will find it addresses the goals and objectives of both early childhood educators along with those of environmental educators.

The book addresses many diverse topics related to early childhood and the environment. From gardening with children to how to include nature programs and placespaces for children with special needs to how creative play in the natural area can foster the holistic development of a child are just a few of the topics included in the book. Wilson explains how nature play impacts children and the benefits of it for all children as they develop their sense of wonder. She also provides ideas on how to develop environmentally literate attitudes, responsible behaviors and values with early childhood activities and experiences.

This book also offers direction on the development and implementation for alternative settings for nature-focused programs; international approaches to nature play in early childhood; the role of adults in an outdoor learning setting; how to integrate nature education into play; and the importance of safety and health for children and outdoor playspace. Each concept is presented with both the early childhood educator and environmental educator in mind.

One area that was most interesting was the chapter on ways to utilize the indoor classroom to promote an understanding and appreciation for the natural environment. Often, when educators are asked to teach about the outdoors and nature, many immediately think this cannot be accomplished if they do not have access to a natural area, park, or outdoor

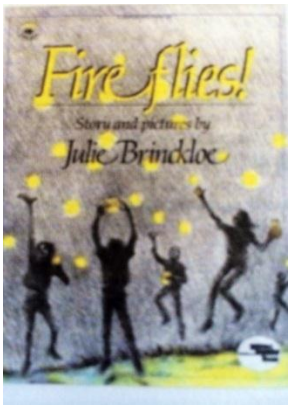
playspace. Wilson provides specific ideas on how to bring the outdoors inside such as using pro-nature books. In addition, she provides direction as to how to set up both an outdoor and indoor nature playspace.

Many educators recognize and promote the concept of interdisciplinary teaching – especially when teaching outdoors. Wilson presents an activity/learning grid which correlates outdoor play activities to different subjects (language and literacy, mathematics, science, and social studies). This grid also includes the supporting materials needed to conduct the outdoor play activity. Activities included are dramatic play/cooking, construction, gardening, and field studies. This portion of the book proves to be a valuable tool for those just venturing into the world of early childhood and environmental education.

Wilson addresses not only the importance of play and the environment but also the research associated with this concept. The theory behind the research as to why children need time outdoors and the opportunity to interact with the natural environment is also supported in the book.

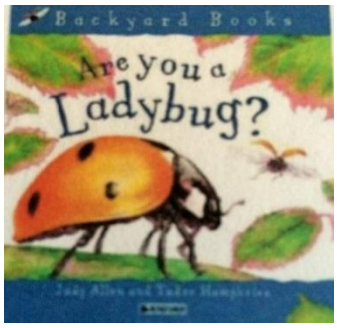
Finally, an epilogue and two appendices are included in the book. The epilogue includes a discussion on the relationship between creative play in natural environments and a more peaceful society. The appendices describe a few natural placespaces and selected resources for the educator. This book is a wonderful resource in itself and would benefit any early childhood or environmental educator, including students in early childhood courses. ISBN - 978-0-415-52674-6; Cost: $30/$35 online.

Fireflies!
by Julie Brinckloe



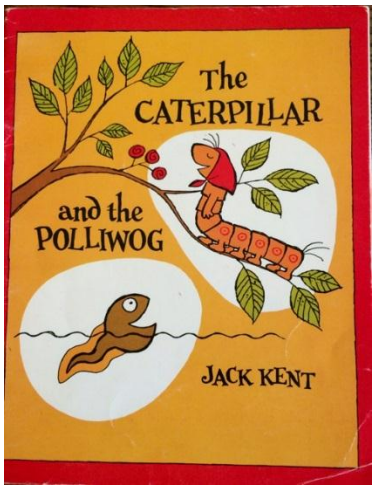
This is the tender story of a young boy whose attention is drawn to the soft glow of fireflies as he gazes longingly out the window on a warm summer evening. Though the evening sky is growing dim, the delight of catching the fireflies is overwhelming. He scurries with anticipation to the cellar to fetch a jar in which to capture the tiny, glowing creatures. Eagerly, he joins his friends, leaping with joy as they gather the precious fireflies into their jars. As the young boy retreats to his bedroom, admiring his cherished possessions, he realizes that their light is gradually grown dim. As they succumb to their imprisonment, a wave of compassion sweeps over the lad as he realizes that he must release his captives, if they are to live. With bittersweet resolve, he opens the jar and releases his treasures back to the freedom of the night sky. The appeal of this book spans multiple age groups. Very young children are captivated by these magical creatures that turn their backyard into an enchanted playground. Older children find allure in an opportunity to join their friends and engage in a delightful romp in the dark of night. Adults fondly remember their carefree youth, the smell of freshly mown grass, the cool dampness of the earth, and the joy of simpler times. Through this delightful story, Brinckloe reminds us all of our responsibilities; to lovingly care for even the smallest of earth's creatures. Ages 3-8. Macmillan Publishing Company, 1985, ISBN: 0-02-713310-9, 28 pages.

Are you a Ladybug?
by Judy Allen and Tudor Humphries



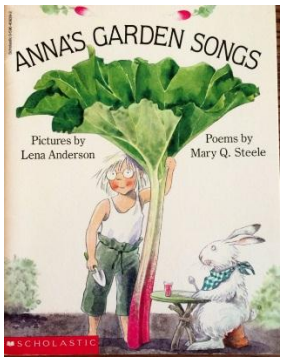
A simple, yet delightful little book tells the story of the life-cycle of a ladybug. Allen and Humphries tell the story through the perspective of the ladybug, explaining how it changes from an egg, to an adult ladybug. With clear and simple text, the authors explain important facts about the ladybug. The engaging, close-up water color illustrations offer depth and precise detail to the narrative, which captivates the audience while they learn about the physical characteristics, diet, habitat, and natural enemies of the ladybug. The narratives in the story draw the reader in, speaking directly to their audience and using phrases such as, "If you are [a ladybug], your parents eat aphids and look like this". The authors' refreshingly simplistic style invites children to enter the world of a ladybug in an entertaining, yet scientifically valuable manner. Ages 3-8. Kingfisher, 2000, ISBN-10: 0753456036, 31 pages.

The Caterpillar and the Polliwog
by Jack Kent



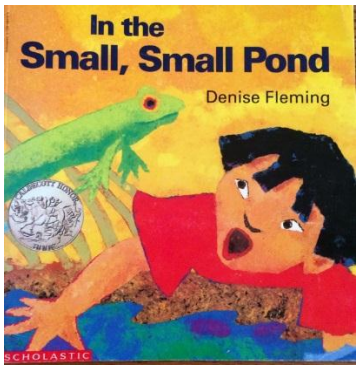
The author takes the reader on a journey with a sassy caterpillar, who befriends a simple polliwog and brags to all her friends that she will turn into something special someday. The polliwog is fascinated with this prospect and longingly wishes that he, too, could be like the caterpillar and turn into something special. He learns from the fish that he will also change into something special and assumes that he will also turn into a butterfly. As he faithfully observes the caterpillar's metamorphosis, he is unaware that his body is also changing. Despite his dismay that he had not turned into a butterfly after all, he realizes that frogs are beautiful creatures, too. This whimsical story, showcasing cartoon-like characters, introduces young children to the basic facts of the life cycles and metamorphoses of the frog and the butterfly. The engaging illustrations and the believable personalities of the animal characters, holds the attention of young children, while at the same time introducing them to some important scientific concepts. The underlying message of this story relates the theme that all nature's creatures are special and beautiful in their own way. Ages 4-8. Aladin, 1985, ISBN-10: 9780671662813, 32 pages.

Anna's Garden Songs
Poems by Mary Q. Steele and illustrations by Lena Anderson



Mary Steele introduces 14 poems featuring fruits, vegetables, and plants grown in a garden. The poems, conveyed in a young girl's voice, add to the distinctive qualities of this book. While the setting of the story, the young girl's garden, adds charm and convenient credibility to the portrayal of each garden item, the real delight of the story are the illustrations. Using detailed watercolors the illustrator combines realistic features of gardens and their produce with whimsical and imaginative characteristics that appeal to young children. Each child in the story is drawn to detail the very personality of the character and a recurring rabbit adds continuity and anticipatory value, which further engages those who share the story together. A mixture of authenticity, child-like wonder, and charming poetry this book offers the perfect segue to introducing gardening to young children in more practical and hands-on way. Ages 5-8. Scholastic, 1990, ISBN-10: 0590436392, 31 pages.

In the Small, Small Pond
by Denise Fleming



True to the style of Denise Fleming's previous books, readers are guided through the story by a recurring animal. In the case of the story, *In the Small, Small Pond*, a frog plays the role. The brilliant colors and unique pulp-painting artistic qualities of this book won Fleming a Caldecott Honor in 1994. The setting of the story provides a backdrop to introduce the animals and plants found in a pond ecosystem. The frog guides the reader on a journey around the pond, showcasing one animal on each page, and recounting descriptive characteristics of the animals with the use of engaging and playful action verbs, alliteration, and rhyme. There is an undertone of growth and change as the story begins with the contrast of tadpole and frog, and concludes with the contrast of change in a pond ecosystem from summer to winter. The text is simple enough to engage a toddler, while the illustrations, rhyme and rhythm of the story captivate older audiences. Fleming combines educational qualities, such as the appreciation of nature, together with the beauty of prose. Adults are drawn back to their youth and memories of visits to a pond, while at the same time, re-examining and interpreting the remarkably complex ecosystem of a pond, through the simplistic wonder and excitement of a child. Ages 2-6. Scholastic, Inc., 1993, ISBN: 0-590-48119-3, 32 pages.

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INTERNATIONAL JOURNAL OF EARLY CHILDHOOD ENVIRONMENTAL EDUCATION (IJECEE)
Addressing Issues, Policies, Practices, and Research That Matter

Information for Authors

The journal has two broad visions:

(a) To encourage thoughtful sharing of information about important ideas, conceptualizations, and frameworks, as well as effective practices and policies in early childhood environmental education; and

(b) To reach an extensive global readership in order to maximize the impact of the thoughtful information.

Thoughtful information may manifest through book reviews, description of educational approaches and programs, research investigations, and development or interpretation of theoretical perspectives. Associations among and between the following will be emphasized:

· Young children
· Family circumstances
· Community opportunities
· Policy mandates or recommendations
· Environmental activities, education, or experiences
· Mechanisms or processes related to knowledge acquisition
· Attachment or maintenance of affective dispositions
· Abilities, behaviors, or skills development related to good decision making in a range of environmental contexts; and
· Cognitive, economic, and social influences or impacts.

In order to reach an extensive global leadership, the journal will be available electronically, at no cost. NAAEE will permanently post all issues of the journal on the *Publications* link on its website. Translation of the articles into other languages is encouraged.

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