



Catch them Young: Children as Messengers of Indigenous Ecological Knowledge for Biodiversity Conservation in Ghana

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Abstract

Biodiversity pivots life and it's crucial for global sustainable development. Global communities have rich indigenous knowledge systems for biodiversity conservation which are often identified with the older members of the society. Involving children in biodiversity projects is very helpful in 'catching them young' in engaging and campaigning for friendly, sound, and sustainable environmental practices. Unfortunately, efforts have not been dispensed much in instructing and/or involving children in educational projects on indigenous knowledge systems related to biodiversity conservation in Ghana due to the domination of Western knowledge systems. This conceptual paper discusses the possibility of decolonizing the Early Childhood Education curriculum by instructing children, who are the future leaders, to be knowledgeable in the indigenous knowledge systems for biodiversity conservation by picking lessons from similar practices in various countries around the globe. This would incite children in Ghana to engage in helpful biodiversity projects by tapping into the wealth of insight into indigenous ecological knowledge to engage in helpful biodiversity projects. This would charge them in joining forces with the older members of the society in repudiating all negative practices that often result in biodiversity degradation in Ghana.

Keywords: Biodiversity conservation, indigenous ecological knowledge, biodiversity projects, early childhood education, Ghana

Introduction

The complexities in life from flora and fauna species to the diverse ecosystems on the planet are referred to as biodiversity (Roe et al., 2019; Adom et al., 2019). All the unfriendly biodiversity practices such as biodiversity loss, relocation, and degradation greatly affect all humans, especially, the local people who are often marginalized but depend largely on the biodiversity resources (Adom,

2019). Due to the phenomenal decline in biodiversity species globally, there is a need to look for multi-faceted approaches to garnering support from the general public toward biodiversity conservation (Ottaviani et al., 2019). One effective approach to achieving the broad-based support of members of society towards biodiversity conservation is to expand biodiversity awareness (Hooykaas et al., 2019). This awareness should not be focused only on the fully-grown members of society but more importantly, on children. Some people erroneously underestimate and/or dismiss children when it comes to discussions on the sustainability and conservation of biodiversity (Roberts & Nash, 2009). Children are very capable of comprehending the key social issues confronting mankind including the loss of biodiversity and what could be done to address this issue (Andersen, 2016). Sir David Attenborough, the English natural historian, and biologist reiterated the need to involve children in all biodiversity-related awareness campaigns. He remarked ‘Every child born into this world has an innate pleasure, delight, interest, and curiosity in the natural world’ (Featherstone, 2013). Due to their natural inclination towards biodiversity, children should also be targeted in biodiversity conservation awareness education. Morón-Monge et al. (2021) opine that such a deliberate attempt of raising biodiversity conservation consciousness in children holds the prospect of making them ‘scientifically literate and environmentally responsible citizens.’ Thus, it is hoped that these well-instructed children would become intergenerational environmental change agents, spearheading initiatives for biodiversity conservation in their communities (Andersen, 2016).

Allowing children to learn and explore their capabilities in helping save the biodiversity resources in the environment is their right that must not be taken away from them. This is highlighted in article 12 of the United Nations Convention on the Rights of the Child (UNCRC) which was passed in 1990. Article 12 mentions that ‘State Parties shall assure to the child who is capable of forming his or her views the right to express those views freely in all matters affecting the child, the views of the child being given due weight...’ (UNCRC, 1991). Therefore, in the spirit of this right of the child, there is an urgent need to inculcate conservation ethos in children now, herein, catch them young, so that when they grow up, they would keep living sustainably with the jealous protection of biodiversity at heart.

Around the globe, in Africa and Ghana, there is the existence of indigenous ecological knowledge that advocates the conservation of biodiversity while promoting its sustainable use. The use of indigenous ecological knowledge founded on ecophilosophy (Ikeke, 2018) evident in the indigenous knowledge systems of societies and countries tremendously contributed to biodiversity conservation in various societies globally. They are intertwined with the cultures of people and as such promotes social inclusiveness, resilience, cooperation, and innovation in local communities

(UNESCO, 2012). The indigenous ecological knowledge adopts the humanist approach, inciting society members to exhibit pro-environmental behaviors (Materer et al., 2012), an indispensable trait that needs to be incorporated into children.

Indigenous knowledge encapsulates the lived process, cosmo-vision, and interaction of life experiences such as language, values, stories, songs, ceremonies, and games, including the observations of the natural environment (Peltier, 2021; Adom, 2021) is a priceless treasure for the children in the community. Indigenous ecological knowledge in the Ghanaian context is culturally appropriated and rooted firmly in the socio-ecological climate of the people. This underscores the constant call by scholars of IK for the inclusion of IK in the curriculum or instruction for especially children in the early childhood education stage (Schafer et al., 2004; Soudee, 2009; Nsamenang & Tchombe, 2011; Hare, 2011; Ball, 2012; Donkor et al., 2013; Ng'asike, 2014; Abdulai, 2016; Adom, 2016; Acharibasam & McVittie, 2021).

In Ghana, the use of indigenous knowledge, pedagogy, and ways of knowing rooted in the culture of the Ghanaian people for instructing children in the Early Childhood Care and Development (ECCD) curriculum has been encouraged (Ministry of Education, 2006, 2019; Acharibasam & McVittie, 2021). Indigenous ecological knowledge when integrated into the teaching curriculum will help in decolonizing ECDD in Ghana which has unfairly been dominated by Western worldviews and knowledge systems (Acharibasam, 2021). It would build healthy habits for nature and its resources in children (Ritchie, 2012). There should be a conscious effort in integrating the rich indigenous knowledge in Ghana into the curriculum of Ghanaian children to incite them toward biodiversity conservation initiatives and projects.

This conceptual paper explores how this could be done by picking lessons from children's biodiversity projects in other countries and juxtaposing them with the indigenous ecological knowledge in Ghana to suggest possible projects that Ghanaian children could pursue in their homes, schools, and communities. The sources include the primary schools' biodiversity project run by Kilkenny Education Centre in Ireland during the autumn/winter of 2015, Lowland Derbyshire schools' biodiversity project, UK and the Newport biodiversity schools' projects in Wales carried out in 2011. The projected significance of the study was to offer a roadmap for educators, parents, guardians, and children on how children could be brought on board in the quest to pursue sustainable and environmentally friendly activities to protect Ghana's biodiversity.

This conceptual paper adopted the theory synthesis paper writing approach by summarizing and integrating extant knowledge of the concept (Jaakkola, 2020; MacInnis, 2011) of indigenous knowledge to increase understanding of how it can impact children's motivation to jealously protect biodiversity. The essence of the summarization was to synthesize what is known about children's

biodiversity projects and indigenous knowledge. On the other hand, integration aided in transforming previous findings on children's biodiversity projects and indigenous knowledge into a new understanding of ways Ghanaian children could be instructed to embark on indigenous knowledge-inspired biodiversity projects that would instill pro-environmental behaviors in them.

Children's activities and projects on biodiversity protection and awareness rooted in indigenous ecological knowledge in Ghana

Using Ghanaian folk or traditional songs for children to ponder over biodiversity protection

There are various highlife musicians in Ghana who have consciously used indigenous plant and animal diversities in Ghana as principal characters in their traditional songs, often referred to as *Adadamu* (Oldies). These traditional highlife Ghanaian artists include Kwabena Owusu (Asebu Amanfi), Nana Kwaku Ampadu, and Samuel Owusu. They used their songs in amplifying the distinctive characteristics of these biodiversity resources and highlight good lessons humans could learn from them. These musicians sometimes creatively use animals and plants who are often found in the forest and domestic homes in Ghana as characters in their music. This makes it easy for the youth in knowing the various animal and plant diversities in their environment and their distinctive characteristics. Owing to this, some of these songs could be played in schools or classes for children to learn about the plant and animal diversities in the Ghanaian society and more importantly, their unique features, medicinal and/or spiritual uses, and their food consumption aspects. There are instances where the storyline or plot expressed in the songs eschew greedy behavior exhibited by some characters in their song while they try to use some of the biodiversity resources for personal use. A typical example is a song titled '*Ebi te yie, Ebi nte yiye*' (Some are comfortable while others are not). The song exposes the greed of those in authority in selfishly amassing the resources meant for the entire society using animal characters in the forest.

Granted, some of the traditional songs were not primarily sung by the highlife musicians in Ghana for conserving biodiversity. Yet, the lessons latent in these Ghanaian traditional songs are important in inciting the children in various schools and in the Ghanaian society to exhibit pro-environmental behaviors. Teachers need to integrate folk or traditional songs consciously and systematically in encouraging children (Zgavec, 2004; Fu, 2010) towards embarking on activities including biodiversity conservation awareness. Teachers can easily download their songs from YouTube sung in Asante Twi and other Ghanaian indigenous languages in Ghana. Then after playing it in class, they could start an interesting discussion about the names of the animals, their distinctive features as illuminated in the song, and the lessons that could be drawn from the songs to protect and sustainably use biodiversity. This could be juxtaposed with information about the animals and plants

mentioned in the song in books and published literature. Enhancing the discussions with images of the animals and plants and allowing children to meditate on them would imbibe in them the need to and/or actions that need to be taken to protect biodiversity. In addition, children who exhibit natural tendencies and passion for music could be tasked as a group by their class teachers to develop traditional or folk song projects on any theme of their choice on biodiversity. These specially produced traditional or folk songs could be recorded and played in class and at other school functions or societal gatherings and invite both young and old towards positive activities on biodiversity protection.

Using Ghanaian Cultural Symbols for reflections on biodiversity conservation in children's school lessons and signages in the school compound

Nature scientists and conservationists have vouched for the relevance of using visual aids such as cultural symbols for communicating issues related to biodiversity conservation (Curtis et al., 2012). Such education is capable of changing the perceptions of people (Sund & Lysgaard, 2013), including children with parents who have not set good examples for nature's conservation. Ghana as a country has various cultural symbols that are used for socio-cultural education. However, these cultural symbols hold great prospects for use in biodiversity-related communication and education. Adom et al. (2018) discussed the potential of using the Ghanaian Adinkra symbols for arousing the environmental consciousness of people including children. The findings from his study could be used as a teaching resource in class discussions on biodiversity protection. Instructors at the early childhood education stage could stimulate classroom discussions on biodiversity conservation using these cultural symbols suggested by Adom et al. (2018) (Fig. 1-3). These cultural symbols with interpretations related to biodiversity conservation could also be used for children's signage projects and placed at vantage points in the school environment.



Figure 1. Sankofa Adinkra Symbol (Educates us of our roles as stewards of the environment and its associated accountability)



Figure 2. *Nkyimkyim* Adinkra symbol (Educates us on the need for society members to set good examples in protecting the environment and ensuring the sustainability of its resources)



Figure 3. *Bese Saka* Adinkra symbol (Educates us of the need to engage in a united effort against all forms of unhealthy environmental activities)

Landscape planting and design projects for children using native flora species

Children could embark on landscape planting and design projects in their schools using native flora species (Ngāi Tūāhuriri Education Committee, 2015). The results of the study conducted by Hooykaas et al. (2019) among the Dutch revealed that a greater section of the population has lost touch with their native biodiversity and this situation, they admitted, can negatively impact their desire to protect biodiversity in the future. Therefore, when children engage in landscape and design projects using native flora species, it will help children to be connected with native biodiversity to enable them to protect biodiversity. These native plants could have their unique features and traditional uses in the Ghanaian society written on small signage against them to educate children as well as the adults in the school. Their traditional uses could include domestic uses, medicinal uses, and spiritual uses. However, this should be done in conjunction with foresters and landscape designers so that microclimate analysis could be conducted to find out the appropriateness of each native species about the soil type, climate, and shading so that such projects would be sustainable.

Children's Art activities (Drawing and Painting) projects for biodiversity conservation using scenes that reflect indigenous ecological knowledge

Children's understanding, interest, and determination to pursue particular goals are rekindled using activities in visual art, such as drawing and painting. They can communicate their experiences with biodiversity in a more easy and relaxed manner in comparison with oral and written communication (Hunt, 2006). Since activities in Visual art is a powerful communication tool (Curtis et al., 2012), encouraging students in embarking on biodiversity-related art projects is a step in the right direction. More so, visual art projects promote active listening and participation (Sibbet, 2010) and could be used as a viable medium for steering up biodiversity conservation awareness. Polfus et al. (2017) in their study re-affirmed the powerful influence and role of visual art in showcasing the experiences of indigenous people on their connections with nature and how the rich diversities in the biological resources could be protected via indigenous knowledge. Participatory art brought on board indigenous people who through the visual representations, revealed their indigenous knowledge related to the environment, empowering them to cling to their resolve to protect biodiversity (Zurba & Friesen, 2014; Rathwell & Armitage, 2016; Morón-Monge et al., 2021). The instructor could assign students to produce pictorial posters in drawing and/or painting on ways to save the biodiversity in their community. As children engage in participatory art where they express their understanding of biodiversity, the human-ecological connections, and how culture and indigenous knowledge aid in the protection of nature's resources, their desire to protect biodiversity will be heightened. Moreover, it will gear them up to nurture sustainable attributes as they grow up and engage in a rigorous campaign in their quarters (home, school, community) to protect biodiversity.

Ghanaian Folk stories tailored for biodiversity conservation for children

Naturally, children love to listen to stories, especially stories about their culture and their environment (Ahi et al., 2014). Folk stories are often passed on from adults (parents, grandparents, etc.) to children. Folk stories are one of the mediums through which traditional knowledge is preserved and perpetuated (Pramanik & Nandi, 2019). These stories are tradition-based and created to reflect the values and expectations of members of a society (Nsor & Takipi, 2018). Folk stories that are mythical, historical, and cultural related to the conservation of specific biodiversity resources (plants, animals, water bodies) hold the great prospects of encouraging children to live sustainably and protect biodiversity. These stories often exemplify the unique relationship between humans and the environment, as well as how peaceful co-existence between humans and biodiversity has fostered a long-lasting bond between each other (Adom, 2019). Folklores or folk stories have been found to build good inner qualities in children while impacting positively on their creativity and aesthetic capabilities (Huiyu, 2018). They have been reported as exerting

considerable influence on the environmental consciousness of children (Saka et al., 2012). In Ghana, there is a myriad of folk stories that illuminate knowledge on biodiversity conservation. Owing to this, students could be given field projects to collect some of these stories from the older members in their vicinity and discuss how they are interconnected with the culture and biodiversity use. The moral imports underlying these folk stories and how they emphasize biodiversity protection and sustainable use could be discussed at length in class for children to appreciate the wisdom enshrined in these folk stories.

Using sacred groves, parks and reserves stepped into local communities as study sites

The early childhood stage is a crucial and awesome period for children to connect with nature, its diverse biological resources, and ecosystems (Beery et al., 2020). The ecophilosophy theory posits that humans have an innate bond with nature and generally prefer natural settings over the built environment (Gifford & Chen, 2016). Connecting with the real, natural environment offers quintessential benefits to the children. These benefits include helping children cope with emotional and behavioral problems (Bulut & Maraba, 2020), relieving their stress levels and enhancing their concentration levels on various tasks (Maller et al., 2009), heightening their innovation and creativity abilities, psychological restoration, as well as physical health and fitness (Gifford & Chen, 2016). Unfortunately, the outdoor life of children to interact with nature has been replaced, for most children (about 80%) in industrialized societies, with the use of technological entertainment gadgets such as television viewing, video games, etc. (World Health Organization, 2019). This sedentary behavior impacts negatively on a child's physical, spiritual, intellectual, and emotional well-being. Therefore, schools need to introduce outdoor activities that would enable children to interact with nature. This is even more crucial today when there is generally low knowledge among children about their local biodiversity where they feel a connection between nature and their culture. Gifford and Chen (2016) sadly note that while children can identify cartoon characters, they are unable to identify common local flora and fauna species.

To increase awareness of their knowledge and comprehension of the indigenous ecological knowledge, children must be actively engaged in biodiversity study projects and trips to natural environments such as sacred groves, parks, reserves, and gardens steeped in their local communities to familiarize and connect with the biocultural diversity in their culture. This outdoor activity would help nurture environmental moral values and reasoning in children. They would develop empathy and responsibility toward biodiversity (Sobko et al., 2018). They would come to learn and experience anthropogenic and biocentric reasons for protecting biodiversity (Gebhard et al., 2003). The carefully planned participatory activities during a real field trip to natural sites with rich cultural

history and indigenous ecological knowledge would intensify their resolve to protect biodiversity which is intertwined with what defines their very existence. The environmentally responsible behavior they would eventually develop (Elliot et al., 2014) would make them problem solvers, eager to express their suggestions on how to save the biodiversity in their local regions (Hart, 1997). The instructor could liaise with the management at the local nature site that s/he wants the children to visit so that they streamline participatory activities that would heighten the experiences of the children with their local biodiversity. Aside from observations of the biodiversity, can the children be assisted to engage in helpful projects to protect the native plant and animal species? These may include helping to repair or put up a fence around the nature site, raising vegetable beds, nursing native species and/or replanting native seedlings in degraded spaces at the site, habitat pile creation, producing simple bird feeders and bat boxes with local materials (or similar projects for other species if these are not available at the natural site visited), gathering of non-timber forest products or engaging in biodiversity-related indigenous knowledge competitions based on the observations at the site. When instructors demonstrate high creativity and innovation, they could come up with helpful activities that would arouse their curiosity about nature (Rice & Torquati, 2013) and bolster children's desire to protect biodiversity.

Time with the Elders: Monthly school program for interaction with indigenous knowledge bearers on ideals for biodiversity protection

'The elders of our time are the heart of cultural existence' (Big Head, 2011, p. 5). The elders in local communities are repositories of indigenous ecological knowledge and when consulted, they would offer indigenous perspectives on topics on environment and biodiversity in the classroom. McCarty and Lee (2014) insist that schools must increase students' contact with the elders in their communities while allowing them to engage in relevant biodiversity-related projects that are culturally appropriate. When attempts are made by school administrators and teachers in bringing them into early grade schools would enable children to tap from their wide repertoire of wisdom related to the environment (Allan et al., 2018). This would equip the children to be knowledge bearers who would continue to hold onto them as they grow up to become adults and be transmitters of this important knowledge to generations. It would aid children to find a perfect balance in the four crucial areas of life which are spiritual, mental, emotional, and physical well-being (Ducharme, 2013).

Big Head (2011) recommends that the traditional protocols for inviting elders to the school must be followed since this is culturally appropriate and a step in giving them the due respect. In the Ghanaian context, any engagement in local communities begins with permission granted by the

traditional chief. Therefore, school administrators can get a list of potential elders who are knowledgeable in the indigenous ecological knowledge for nature conservation from the traditional chief and his cabinet of elders. The traditional chief would be able to recommend and task such elders to offer this service to schools to help the children to keep in touch constantly with their indigenous knowledge. Admittedly, the elderly folks in the various local communities would wholeheartedly embrace this concept. This is because it is their wish to hand over the indigenous knowledge to the younger generation as they deem it a duty to qualify them for the status of ancestors after their physical demise (Adom, 2017). Therefore, setting aside a specific day and time every month for children to interact with the elders in their community on indigenous ecological knowledge on the biological diversities would inculcate the virtues of respect, reciprocity, and responsibility toward nature (Kimmerer, 2012).

Conclusion

Children have a close natural bond with nature and its rich biodiversity resources. They are special creatures who are able beings to think and come out with solutions for protecting biodiversity. Pro-environmental behaviors could be nurtured within them at this early stage of their lives. There is the need for school administrators, teachers, parents, community leaders and governmental authorities, especially those in environmental protection agencies to ‘catch the children young’ in heightening their awareness of biodiversity conservation issues. That notwithstanding, as cultural beings, children must be constantly brought close to their indigenous ecological knowledge for them to be abreast with the biocultural diversity in their local environments. Conscious efforts must be made by teachers to incorporate into the training of children by assigning them indigenous ecological knowledge-inspired biodiversity projects. The participatory activities on biodiversity conservation would help them greatly in their personal development, mentally, spiritually, emotionally and physically. It would make the children knowledge bearers of their indigenous ecological knowledge, inciting them even more to exhibit environmentally responsible behaviors that would bolster their desire to save the rich biodiversity resources as they grow up. It is recommended that the Environmental Protection Agency, Forestry Commission, Wildlife Division and the Ministry of Lands and Natural Resources must liaise with the Ministry of Education to develop programs for Ghanaian schools, especially those in the basic schools aimed at teaching children the indigenous ecological knowledge (IEK) related to the biodiversity in their respective regions. In these programs, indigenous ecological knowledge experts must be invited to discuss extensively how the IEK would be streamlined into the school curriculum and implemented in the various schools. School administrators must initiate biodiversity projects that factor IEK and

supervise their instructors to assist students in rigorously engaging in them. These efforts would help decolonize the early childhood education curriculum, making the school children knowledgeable in their IEK, to be pro-environmentalists. Future studies must experiment with the use of these suggested indigenous ecological knowledge-inspired biodiversity projects for children and evaluate their successes and limitations. These studies which must take adopt varied research methodologies must ascertain the benefits of such projects and their impacts on the personal and academic development of the children. These empirical studies would help school administrators in designing locally relevant and appropriate children IEK biodiversity projects in their respective schools.

References

- Abdulai, A. (2016). Pedagogy of Indigenous play: The case of Ghana's early childhood education. *International Journal of Research and Review in Education*, 3, 28-34.
- Acharibasam, J. B., & McVittie, J. (2021). The use of a two-eyed seeing approach to include Indigenous Knowledge in Early Childhood Care and Development in Ghana. *International Education Journal: Comparative Perspectives*, 20(1), 81-98.
- Acharibasam, J. B. (2021). Integrating Indigenous Ecological Knowledge into Early Childhood Education in Boania Primary School, Ghana. Doctoral Dissertation, University of Saskatchewan.
- Acquah, S. B., Sraku-Lartey, M., Samar, S. B., & Djagbletey, G. D. (2018). Traditional knowledge and consumption of forest plant foods in Ghana. *Ghana Journal of Forestry*, 34(1), 49-70.
- Adom, D. (2017). Promoting Cultural Traditions, Social Inclusion and Local Community Participation in Environmental Development Schemes. *Journal of Urban Culture Research*, 14(1): 80-103.
- Adom, (2019). Indigenous Knowledge for Environmental Sustainability Education in Ghana: Myths. *Agriculture and Food: e-Newsletter*, 1(3): 43-45
- Adom, D., Umachandran, K., Ziarati, P., Sawicka, B. & Appiah, P. S. (2019). The Concept of Biodiversity and Its Relevance to Mankind: A Short Review. *Journal of Agriculture and Sustainability*, 12(2): 219-231
- Adom, D. (2021). The Sustainability of the Science in the Productive Cultural Instruments of African Ancestors for Natural Resource Management. *Journal of African Art and Culture*, 5(1): 45-71
- Adom, D. (2016). Asante Indigenous Knowledge Systems: Repositories of Conservation Ethics for Ghana's Biodiversity. *Proceedings of The Academic Conference of on Interdisciplinary Approach*. Sub-Saharan Publisher, 7(2), 4th August, 2016- Uthman Danfodio University, Sokoto, PTF I Hall, Sokoto, Sokoto State, Nigeria
- Adom, D. (2019). The Place and Voice of Local People, Culture, and Traditions: A Catalyst for Ecotourism Development in Rural Communities in Ghana. *Elsevier's Scientific African*, 6 (e00184): 1-22
- Adom, D., Opoku, M., Newton, & Yeboah, A. (2018). Adinkra cultural symbols for environmental sustainability education in Ghana. *World Environment*, 8(2), 36-46.
- Allan, B., Perreault, A., Chenoweth, J., Biin, D., Hobenshield, S., Ormiston, T... & Wilson, J. (2018). *Pulling Together: A Guide for Teachers and Instructors*. Victoria, BC: BCcampus. Retrieved from <https://opentextbc.ca/indigenizationinstructors/>

- Andersen, P. J. (2016). Children as intergenerational environmental change agents: Using a negotiated protocol to foster environmentally responsible behavior in the family home. Doctor of Education thesis, School of Education, University of Wollongong. <https://ro.uow.edu.au/theses/4945>
- Ball, J. (2012). Identity and knowledge in Indigenous young children's experiences in Canada. *Childhood Education*, 88(5), 286-291.
- Berat, A. H. İ., Dilara, Y. A. Y. A., & Ozsoy, S. (2014). The concept of environment in folktales from different cultures: Analysis of content and visuals. *International Electronic Journal of Environmental Education*, 4(1), 1-17.
- Beery, T., Chawla, L., & Levin, P. (2020). Being and becoming in nature: Defining and measuring connection to nature in young children. *International Journal of Early Childhood Environmental Education*, 7(3), 3-22.
- Big Head, R. (2011). Elder wisdom in the classroom. *Walking Together: First Nations, Métis and Inuit Perspectives in Curriculum*. Alberta Education. Available at www.learnalberta.ca
- Bulut, S. & Maraba, D. (2020). The Effect of Nature on Child Development. *Curr Res Psychol Behav Sci.*, 1(2), 1008.
- Curtis, D. J., N. Reid, and G. Ballard. 2012. Communicating ecology through art: what scientists think. *Ecology and Society*, 17(2), 3. <http://dx.doi.org/10.5751/es-04670-170203>
- Donkor, A. K., Issaka, C. A., & Asante, J. (2013). Cultural practices and education in Ghana: The effects of traditional culture on parental involvement in education. *Research on Humanities and Social Sciences*, 3(7), 110-120.
- Ducharme, J. (2013). Incorporating indigenous knowledge within student supports: Elder-in-residence position. *BU Journal of Graduate Studies in Education*, 5(2), 27-32.
- Elliot, E., Eycke, K. T., Chan, S., & Müller, U. (2014). Taking kindergartners outdoors: Documenting their explorations and assessing the impact on their ecological awareness. *Children, Youth and Environments*, 24(2), 102–122. <https://doi.org/10.7721/chilyoutenvi.24.2.0102>
- Featherstone, S. (2013). *Setting the scene: Creating successful environments for babies and young children*. Bloomsbury Publishing
- Fu-lin, L. I. U. (2010). The change of impart and inherit for fortune-telling song between China and Japan. *Journal of Wuhan Conservatory of Music*, 3, 155-164.
- Gebhard, U., Nevers, P., & Billmann-Mahecha, E. (2003). Moralizing trees: Anthropomorphism and identity in children's relationships to nature. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment* (pp. 91–111). Cambridge, MA: MIT Press.
- Gifford, R., & Chen, A. (2016, March 31). *Children and nature: What we know and what we do not*. University of Victoria.
- Guo, H. (2018, November). A Study on the Educational Strategy of Using Folktales in Kindergarten. In 2018 5th International Conference on Education, Management, Arts, Economics and Social Science (ICEMAESS 2018) (pp. 748-751). Atlantis Press.
- Hare, J. (2011). Indigenous knowledge in education. *Visions of the heart*, 3, 90-112.
- Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care*. London, UK: Earthscan/UNICEF.
- Hooykaas, M. J., Schilthuisen, M., Aten, C., Hemelaar, E. M., Albers, C. J., & Smeets, I. (2019). Identification skills in biodiversity professionals and laypeople: A gap in species literacy. *Biological Conservation*, 238, 108202.
- Hunt, P. (2006). *Understanding children's literature*. Routledge.
- Ikeke, M. O. (2018). Ecophilosophy and African Traditional Ecological Knowledge. *IDEA*, 30(1), 228-240.
- Jaakkola, E. (2020). Designing conceptual articles: four approaches. *AMS Review*, 10, 18–26. <https://doi.org/10.1007/s13162-020-00161-0>

- Kimmerer, R.W. (2012). Searching for synergy: Integrating traditional and scientific ecological knowledge in environmental science education. *Journal of Environmental Studies and Science*, 2, 317–323.
- MacInnis, D. J. (2011). A framework for conceptual contributions in marketing. *Journal of Marketing*, 75(4), 136–154.
- Maller, C., Townsend, M., Leger, L., Henderson-Wilson, C., Pryor, A. (2009) Healthy parks, healthy people: The health benefits of contact with nature in a park context. In *The George Wright Forum*, 26(2), 51-83.
- Materer, S., Valdivia, C., & Gilles, J. (2002). Indigenous Knowledge Systems: Characteristics and importance to climatic uncertainty. Department of Agricultural Economics Working Paper No. AEWP 2001-2003. University of Missouri
- McCarty, T., & Lee, T. (2014). Critical culturally sustaining/revitalizing pedagogy and Indigenous education sovereignty. *Harvard Educational Review*, 84(1), 101-124
- Ministry of Education. (2006). Curriculum for Kindergarten (Kindergarten 1-2). Curriculum Research and Development Division, Ghana Education Service, Accra, Ghana.
- Ministry of Education (2019). Kindergarten curriculum for preschools. National Council for Curriculum and Assessment. Ministry of Education, Accra, Ghana
- Morón-Monge, H., Hamed, S. & Morón Monge, M. D. C. (2021). How Do Children Perceive the Biodiversity of Their nearby Environment: An Analysis of Drawings. *Sustainability*, 13, 3036. <https://doi.org/10.3390/su13063036>
- Ngāi Tūāhuriri Education Committee (2015). Ideas and considerations for detailed design and naming for the ‘Eastern Cluster’ of Schools which includes Avonside Girls/Shirley Boys: A Ngāi Tūāhuriri Perspective. DK Lodge Holdings Limited
- Ng’asike, J.T. (2014). African early childhood development curriculum and pedagogy for Turkana nomadic pastoralist communities of Kenya. *New Directions for Child and Adolescent Development*, 146, 43–60.
- Nsamenang, A. B., & Tchombe, T. M. S. (2011). Handbook of African educational theories and practices: A generative teacher education curriculum presses. Human Development Resource Centre (HDMC). Bamenda, North West Region Cameroon
- Nsor, C. & Takipi, N. (2018). Folk-lore and Traditional Beliefs; Relics of the Past or Crucial Vehicles in Biodiversity Conservation: A case study of Bachama people of Numan, Adamawa State. *Proceedings of 6th NSCB Biodiversity Conference; Uniuyo 2018 (41 - 48pp)*
- Ottaviani, G., Götzenberger, L., Bacaro, G., Chiarucci, A., de Bello, F., & Marcantonio, M. (2019). A multifaceted approach for beech forest conservation: Environmental drivers of understory plant diversity. *Flora*, 256, 85-91.
- Peltier SM (2021) The Child Is Capable: Anishinaabe Pedagogy of Land and Community. *Front. Educ.*, 6, 689445. doi: 10.3389/educ.2021.689445.
- Polfus, J. L., Simmons, D., Neyelle, M., Bayha, W., Andrew, F., Andrew, L., & Manseau, M. (2017). Creative convergence: exploring biocultural diversity through art. *Ecology and Society*, 22(2), 4.
- Pramanik, S. K., & Nandi, N. C. (2019). Folklore and biodiversity conservation concern: An Indian perspective of food security. *Journal of Environment and Sociobiology*, 16(2), 207-215.
- Rathwell, K. J., and D. Armitage. 2016. Art and artistic processes bridge knowledge systems about social-ecological change: an empirical examination with Inuit artists from Nunavut, Canada. *Ecology and Society*, 21(2), 21. <http://dx.doi.org/10.5751/es-08369-210221>.
- Rice, C. S., & Torquati, J. C. (2013). Assessing connections between young children’s affinity for nature and their experiences in natural outdoor settings in preschools. *Children, Youth and Environments*, 23(2), 78–102. <https://doi.org/10.7721/chilyoutenvi.23.2.0078>

- Ritchie, J. (2012). Titiro Whakamuri, Hoki Whakamua: Respectful integration of Maori perspectives within early childhood environmental education. *Canadian Journal of Environmental Education*, 17, 62-79.
- Roberts, A., & Nash, J. (2009). Enabling students to participate in school improvement through a Students as Researchers programme. *Improving Schools*, 12(2), 174-187.
- Roe, D., Seddon, N., & Elliott, J. (2019). Biodiversity loss is a development issue. International Institute for Environment and Development. Available at: <https://pubs.iied.org/pdfs/17636IIED.pdf> (accessed 22 February 2021).
- Saka O.J, Emmanuel T.I, Abideen A.A, Emeka E.O, & Adesoji A.A. (2012). The Role of Traditional Laws and Taboos in Wildlife Conservation in the Oban Hill Sector of Cross River National Park (CRNP), Nigeria. *Journal of Human Ecology*, 39(3), 209-219.
- Schafer, J., Ezirim, M., Gamurorwa, A., Ntsonyane, P., Phiri, M., Sagnia, J., ... & Bairu, W. W. (2004). Exploring and Promoting the Value of Indigenous Knowledge in Early Childhood Development in Africa. *International Journal of Educational Policy, Research, and Practice: Reconceptualizing Childhood Studies*, 5(3), 61-80.
- Sibbet, D. 2010. Visual meetings: how graphics, sticky notes and idea mapping can transform group productivity. John Wiley and Sons, Hoboken, New Jersey, USA. <http://dx.doi.org/10.1002/9781119200086>
- Singh, N. K., & Reyhner, J. (2013). Indigenous knowledge and pedagogy for Indigenous children. In J. Reyhner, J. Martin, L. Lockard, & W. S. Gilbert (Eds.), *Honoring our children: Culturally appropriate approaches for teaching Indigenous students* (pp. 37-52). Flagstaff, AZ: Northern Arizona University.
- Sobko, T., Jia, Z., & Brown, G. (2018). Measuring connectedness to nature in preschool children in an urban setting and its relation to psychological functioning. *PLOS ONE*, 13(11), e0207057. <https://doi.org/10.1371/journal.pone.0207057>
- Soudee, A. R. (2009). Incorporating Indigenous Knowledge and Practice into ECCE: A Comparison of Programs in The Gambia, Senegal and Mali. *Current Issues in Comparative Education*, 11, 15-23.
- Sund, R. & Lysgaard, J.G. (2013). Reclaim 'education' in environmental and sustainability education research. *Sustainability*, 5, 1598-1616. *The Independent Ghana* (2019, July 11). Nana Ampadu, Yaw Sarpong and Asomafo, wind Afrique to tour Europe. <https://theindependentghana.com/2019/07/nana-ampadu-yaw-sarpong-asomafo-wind-afrique-to-tour-europe/11>
- United Nations Convention on the Rights of the Child (UNCRC). Article 12, 1991. <https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child#:~:text=Article%2012,1.&text=States%20Parties%20shall%20assure%20to,and%20maturity%20of%20the%20child.>
- UNESCO. 2012. Education for Sustainable Development in Action Good Practices. <https://unesdoc.unesco.org/ark:/48223/pf0000217854>
- World Health Organization (2019) To grow up healthy, children need to sit less and play more. <https://www.who.int/news/item/24-04-2019-to-grow-up-healthy-children-need-to-sit-less-and-play-more> (Accessed 13/04/2022)
- Zgavec, M. (2004). Slovenska ljudska glasba [Slovenian Folk Music]. *Glasba v soli in vrtcu*, 9, 3-4.
- Zurba, M., & Friesen, H. A. (2014). Finding common ground through creativity: exploring indigenous, settler and Métis values and connection to the land. *International Journal of Conflict and Reconciliation*, 2, 1-34.