Integrating Indigenous Ecological Knowledge into Early Childhood Education in Boania Primary School, Ghana

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ABSTRACT

In the context of Ghana and more broadly sub-Saharan Africa Western content dominates Indigenous content in early childhood education. As a result, there are increasing calls to Indigenize Early Childhood Care and Development in Ghana and sub-Saharan Africa. Coupled with increasing levels of environmental degradation these calls have centered on Indigenous Ecological Knowledges. The idea is that when integrated into early learning, Indigenous Ecological Knowledges will among other things decolonize Early Childhood Care and Development and also enhance sustainability outcomes in children by connecting them to the environment. However, few studies have examined the methodological framework for integrating Indigenous content into early learning in Ghana. To integrate Indigenous Ecological Knowledges into early childhood education, two different knowledges, Dominant Western Knowledge and Indigenous Ecological Knowledge, are being brought together. Hence there exists the possibility of one knowledge dominating the other. Therefore, this research adopted a two-eyed seeing Indigenous methodology to integrate Indigenous Ecological Knowledge into Early Childhood Environmental Education in Boania Primary School in Northern Ghana. As the holders of Indigenous knowledge, two Indigenous Elders helped to integrate the local Indigenous Ecological Knowledge into Kindergarten two (KG2) environmental studies topics by visiting the school to teach and take children out on outdoor learning activities.

The main purpose of this study was to find out how Indigenous Ecological Knowledge can be integrated into Early Childhood Environmental Education curriculum and pedagogy in one rural primary school in Ghana to determine if Indigenous Ecological Knowledge could help resist the continuous domination of Early Childhood Education by Dominant Western content without privileging one form of knowledge over the other. Data were collected by using multiple methods of document analysis, participant observation, and in-depth interviews. The findings revealed that the integration of Indigenous Ecological Knowledge into Early Childhood Education improves learning outcomes by taking environmental studies outdoors and making learning more practical and experiential. Also, the two-eyed seeing methodology adopted

provided a framework that prevented the further privileging of Dominant Western Knowledge over Indigenous Ecological Knowledge.

Keywords: early childhood education, environmental education, sustainability, Indigenous knowledge, Indigenous ecological knowledge, dominant western knowledge, two-eyed seeing Indigenous methodology, decolonization, knowledge domination.

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DW-K	Dominant Western Knowledge
DW	Dominant Western
EE	Environmental Education
ECCD	Early Childhood Care and Development
ECE	Early Childhood Education
ECEE	Early Childhood Environmental Education
GES	Ghana Education Service
IEK	Indigenous Ecological Knowledge
IK	Indigenous Knowledge
KG2	Kindergarten 2
NAAEE	North American Association of Environmental Education
MDAs	Ministries, Departments, and Agencies
MDG's	Millennium Development Goals
TEK	Traditional Ecological Knowledge

PROLOGUE

Wilson (2008) stated "all stories reflect the storyteller and where they are in their lives" (p.22). I come from a village called Paga Buru Boania, a rural community of about 1,331 people situated in the Kassena-Nankana West District of Northern Ghana with Paga as the district capital (Ghana Statistical Service, 2014). The village is made up of the Kasena ethnic group who is a collection of people speaking Kasem, a language of the gurusi sub-branch (Awedoba, 2000). The ethnic group is geographically located on the border between Ghana and Burkina Faso. Kazaresam (1975 as cited in Aketema, 2017) explained that colonial border divisions between France and Britain affected the Kasena ethnic group. Emerging from the Berlin treaty, France and Britain reached an agreement on the boundary between Ghana and Upper Volta (now Burkina Faso) in 1898 (Kazaresam 1975 cited in Aketema, 2017). Consequently, the Kasena ethnic group was divided into two groups, one group belonged to the British in Ghana whilst the other group belonged to the French in Upper Volta.

Paga Buru Boania is part of three rural communities collectively called ‘Buru (comprising of Buru Nakolo, Buru Navio, and Buru Boania), with Buru Boania being the oldest of the three communities. These three communities came from a common ancestor, named Gaayia who originated from Songɔ which is in present-day Burkina Faso. Gaayia was a great hunter but had to leave his home in Songɔ due to a family dispute. Among the Kasena, it is part of the tradition that the brothers of a newly married wife come for entertainment and refreshment (locally called Kayidiri). It is also cultural that a dog is part of the menu on this occasion. The story is told that Gaayia one day went on a hunting expedition and when he returned home, he realized that his favorite hunting dog had been killed for the Kayidiri. He became angry, quarreled with the family, packed his bags, and left (home) Songɔ. In search of a new home, he came to settle at Buru Boania. Hence, the three communities of Buru trace their ancestry to Gaayia. However, all these three communities fall under the authority of Paga, the Kassena-Nankana West District capital.

Within the village of Buru Boania specifically, Gaayia’s children later split into three of the four families that make up the community. First, is the Tuniabia who comprise the chieftaincy family; only members from this family can become chiefs in the village. Second, is the Ayerabia, the family in charge of (manchongo) settling matters together with the chief. Members from this family must agree before the chief can pronounce final judgement on a dispute. In their absence, a dispute cannot be settled. The third family is the wusigabia also known as ‘tangwamtu’ (translated owners of the sacred grove). This family oversees the deity. Without them, the community cannot worship our ancestors (sacred crocodiles) and they also advise on spiritual matters. The last family is the Achobia who serves as a liaison between the paramount chief of Paga and the community of Boania. Although this family has become part of Boania, they are not descendants of Gaayia. They come from a different community called Badunu (which is part of Paga) but came to settle in Boania. That is why they serve as a liaison between the community of Boania and the paramountcy of Paga.

I belong to the family of Ayerabia in the community of Buru Boania. Why is this long introduction important? Among the Kasena, a family genealogy is important because it ties the

individual to the group. An individual is identified through the family (group). The community emphasizes the group or collective co-existence rather than self. Khupe (2014) observed that although there are differences among the worldviews of various African ethnic groups, the idea of collective co-existence and interdependence is one of the commonest features among African worldviews. Hence the individual is seen as interdependent within a group (Khupe, 2014).

Through my grandfather, I learned that it was not only the common ancestry that united these three communities with Paga but the sacred crocodiles. These held all the communities together. The crocodiles represent the peoples' souls and the souls of their ancestors. A good rainfall, harvest, or health is reliant on the sacred crocodiles. Harming a crocodile, therefore, means angering the gods and the ancestors and this could lead to the destruction of the whole village. Because the peoples' souls resided in the crocodiles, whenever a crocodile died, it also signified the potential demise of a member of the community. Every child, once he or she began to walk, and talk knew of our sacred crocodiles. Our oral traditions, songs, stories, drawings, and other cultural ornaments portrayed the sacred crocodiles. This knowledge has existed for several thousands of years and has been passed down from one generation to the next through oral tradition.

Upon beginning formal education, I was reintroduced to the crocodile but in a different way. I was taught through the environmental science education program that the crocodile is a Nile crocodile, a large semiaquatic reptile located in the tropics and from a family of Crocodilia (Pooley & Gans, 1976). I was taught that our friendly crocodile "is a remarkably efficient predator" (Pooley & Gans, 1976, p. 114), always waiting to attack its prey of fish, amphibians, animals, and sometimes human beings. This was the only knowledge in the science curriculum about the crocodile and this teaching marked the clash of my two worlds, the school teaching and home teaching (Onwauchi, 1972). I weighed the teachings of my grandfather and science teacher. Unfortunately, I picked my science teacher's because it was the only way to pass my exams in school and as I climbed in the academic ladder of formal education my grandfather's teaching began to fade. Similarly, the school marked the straining of my relationship with our sacred crocodiles because I started to see the crocodiles differently and with fear. The question

however is could the school have taught my grandfather's teachings side by side with what was contained in the science curriculum?

My story is a microcosm of the community and their current relationship with the sacred crocodiles. Instead of treating them as sacred, the crocodiles are now seen as a source of revenue through tourism. Our ancestors have been reduced to money-making machines. Even knowledge of them is no longer passed down to the young ones through formal education. Formal education has made us believe that the Dominant Western knowledge of the crocodile is better than Indigenous Knowledge of our sacred crocodile. As Ng'asike (2014) cautioned, focusing educational programs on Dominant Western-styled structures and on formal education alone may create the perception among local people that Dominant Western educational values are more important than Indigenous values. Hence, this research exploring how Kasena's IEK can be integrated into Early Childhood Care and Development (ECCD) in Boania Primary School is a way of reconnecting with the teachings of my grandfather and resisting the continuous domination of ECCD by Dominant Western Knowledge. I believe the two knowledges can exist side by side in school curricula and this explains why the research adopts a two-eyed seeing approach.

CHAPTER ONE - DOMINANT WESTERN THEORETICAL AND EPISTEMOLOGICAL DOMINATION OF EARLY CHILDHOOD EDUCATION AND THE CASE FOR INDIGENOUS ECOLOGICAL KNOWLEDGE

1.0 Introduction

The continuous domination of Early Childhood Education (ECE) curricula and pedagogy by Dominant Western (DW) epistemology is an issue that has received considerable attention from scholars globally (Ball, 2010; Dahlberg & Moss, 2005; Gergen, 1992; Nsamenang, 2005:2007; Nsamenang & Tchombe, 2011; Pearson & Degotardi, 2009; Pence & Nsamenang, 2008; Pence & Shafer, 2006; Ritchie, 2012). Conclusions from studies thus far have noted that the practice of ECE has been informed and dominated by theories developed in DW contexts without any consideration of Indigenous content (Gergen, 1992; Nsamenang, 2007; Pearson & Degotardi, 2009). In the context of Ghana (and more broadly sub-Saharan Africa) DW knowledge (DW-K) dominates Indigenous content in ECE (Abdulai, 2016; Donkor, Issaka, & Asante, 2013; Ng'asike, 2014; Tackie-Ofosu, Mahama, Vandyck, Kumador, & Toku, 2015; Nsamenang, 2008). In Ghana and sub-Saharan Africa, ECE is known as Early Childhood Care and Development (ECCD) (see Garcia, Pence, & Evans, 2008).

As a result, several scholars have called for the inclusion of Indigenous content in the curriculum and pedagogy of ECCD (Abdulai, 2016; Donkor, Issaka, & Asante, 2013; Ng'asike, 2014; Nsamenang, 2005; 2007; 2008; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008; Pence & Shafer, 2006). Abdulai (2016), for example, called for efforts to go beyond mother tongue to include other aspects of Indigenous content in Ghana's ECCD. Generally, the reasons behind these calls range from "philosophical and ethical to the utilitarian and pragmatic" (Pence & Shafer, 2006, p. 2). But the strongest argument has been that the centering of Indigenous content in ECCD will help resist the continuous domination of ECCD by DW-K (Ng'asike, 2014; Nsamenang, 2007; 2008; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008).

Nonetheless, given the increasing levels of environmental crises and the reality that people's sense of connection to nature "has paled, withered, and is finally failing" (Pyle, 2003, p. 206), the demand to include Indigenous content in ECE has been strongest towards Indigenous Ecological Knowledges (IEKs) (see Ritchie, 2012). The argument is that when integrated into Early Childhood Environmental Education (ECEE), IEKs will help connect children more to nature and develop in them love and respect towards nature/environment (Ritchie, 2012). IEKs have the cultural framework of love, respect, reciprocity, and responsibility towards nature (Kimmerer, 1998; 2002; Reid, Teamey, & Dillon, 2002), and so are best suited to develop in children the love and respect towards nature. As Pyle (2003, p. 206) argued, "there is no longer any doubt that a strong individual sense of connection to nature and natural processes is utterly essential to the healthy coexistence of humans with their biological neighbours and physical setting".

Besides, research on the integration of Indigenous content into education in general and into ECE programs would: help children transition from the home environment to the school environment (Pence & Shafer, 2006), help decolonize ECE (Nsamenang, 2007; Pence & Shafer, 2006; Ritchie, 2012; Serpell, 1994), create respect for Indigenous people and their knowledge (Nsamenang, 2007; Pence & Shafer, 2006; Ritchie, 2012; Serpell, 1994), enhance the preservation of IEK as a way of knowing and a cultural heritage (Abdi & Cleghorn, 2005; Aikenhead & Ogawa, 2007; Ball, 2010; Jegede, 1994; Simandiraki, 2006), facilitate cognitive development in children as an integral part of culture (Gelman & Brenneman, 2004; Glasser, 1991; Ogbu, 1992; Schafer et al., 2004), support ECE education to meet the cultural realities of children (Cajete, 1994; Dei, Hall, & Rosenberg, 2002; Pence & Nsamenang, 2008; Wane, 2002), enhance children's knowledge of a place and foster a stronger relationship with place (Cajete, 1999; Parrota & Trosper, 2012), provide a valid counter-narrative to the DW techno-industrial emphasis that continues to damage our planet (Hunter, 2002; Ritchie, 2012; Shava, 2008), help fill the gaps in Western science by providing a wider view of reality (Battiste, 2002; Kimmerer, 2002; Mazzocchi, 2006; Phiri, 2008; Sheya, 2014; Simpson, 2002), help take ECE outdoors and make learning more experiential and hands on (Nsamenang, 2005; Woodhouse & Ndongko,

1993), and finally help achieve environmental sustainability and adapt to climate change (Hanna & Oliva, 2016; Ritchie, 2012; Reid, Teamey & Dillon, 2002).

Despite the surge in calls to integrate Indigenous content into ECCD, especially to integrate IEK into ECEE, there has not been an examination of the methodological framework for integrating Indigenous content into ECCD in Ghana, a gap this research sought to fill.[1] As Nadasdy (1999) noted many works continue to advocate the use of IEK and its integration into programs without proposing a method for achieving this. Given the power imbalances that exist between IEK and DW-K, scholars have cautioned against the danger of one knowledge dominating the other (see Kim & Dionne, 2014; Sundar, 2002; McCarter, Gavin, Baereleo, & Love, 2014) or privileging one form of knowledge over the other. Based on this, the methodological framework that is adopted to integrate IEK into ECCD is important. Therefore, this research emerged to find out how IEK could be integrated into ECCD, specifically ECEE, to help resist DW-K domination of curriculum and pedagogy, by adopting a two-eyed seeing Indigenous methodology, a qualitative case study approach, and postcolonial theory.

1.1 Purpose Statement

The overall purpose of this study was to examine how IEK can be integrated into ECCD curriculum and pedagogy in one rural primary school in Ghana, to determine if IEK could help resist the continuous domination of ECCD by DW content, without privileging one knowledge over the other. To achieve this, a two-eyed seeing Indigenous approach, a case study methodology, and post-colonial theory were adopted under the guidance of an Indigenous research paradigm.

[1] Early Childhood Education (ECE), Early Childhood Care and Education (ECCE), and Early Childhood Care and Development (ECCD) are used interchangeably in this research to mean the same thing. I choose to use ECE but will use ECCD when making particular references to Africa where that term is more popular.

1.2 Research Questions

Having identified a research gap from reviewed literature and the practice of ECCD in Ghana, the research aimed at addressing how a two-eyed seeing approach could help integrate IEK into ECCD to resist DW domination of ECCD in Boania Primary School, Ghana. To achieve this, the following sub-questions were also asked from which the themes for data analysis were derived. These sub-questions were:

- To what extent do teachers include DW-K and IEK in their teaching?
- In what ways do children and teachers learn to see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the strengths of DW ways?
- How do teachers teach ECCD curricula with the understanding that IEK and DW-K are equal?
- How do teachers and pupils deal with conflict that arises from the integration of IEK into ECCD?
- What outcomes (curricular outcomes and environmental sustainability outcomes) emerged due to the inclusion of IEK in the curricula and pedagogy of ECCD in Boania Primary School? Such as:
    - How has the integration of IEK into ECCD helped unsettle and resist DW-K domination of ECCD in Boania Primary School?
    - To what extent has the integration of IEK into ECCD helped decolonize and create respect for Indigenous people and their knowledge in the community of Boania?
    - To what extent has the integration of IEK into ECCD helped learning to reflect the Ghanaian dual knowledge base?
    - How has the inclusion of IEK in ECCD enhanced love for nature and achieved environmental sustainability outcomes?
    - To what extent has the integration of IEK into ECCD helped preserve IEK as a knowledge form?

- What are the opportunities and challenges of including IEK in ECCD curriculum and pedagogy in Boania Primary School?

1.3 Significance of the study

Much has been written on the domination of ECCD by DW content and the need to include Indigenous content (Abdulai, 2016; Hyde & Kabiru, 2003; Ng'asike, 2014; Nsamenang, 2008; Pence & Nsamenang, 2008; Pence & Shafer, 2006). Importantly, these scholars have enumerated the benefits that ECCD stands to gain should Indigenous content be integrated into the program.

As a result, the integration of IEK into ECEE is also gaining prominence among scholars (North American Association of Environmental Education [NAAEE], 2010; Ritchie, 2012). Ritchie (2012) argued that IEKs will not only help decolonize ECE but will also help connect children more to nature by developing in children the love and respect towards nature /environment. According to Reid, Teamey, and Dillon (2002), IEKs have the cultural framework of love, respect, reciprocity, and responsibility towards nature. Based on this, Ritchie (2012) argued that IEKs are more suited to connect children to nature because they emphasize "respectful interdependence with nature" (p. 63).

However, few studies have examined the methodological framework for integrating IEK into ECCD in Ghana. As a result of this, teachers have been largely left on their own to figure out what IEK exists in their community, and how they might incorporate it into their teaching. This fairly random approach reinforces the power imbalance between IEK and DW-K. For example, I observed in the teaching of Religion in Boania Primary School that children are taught more DW-K (Biblical content and prayers) than traditional ancestral worship. Meanwhile, the curriculum states that children be taught both ways of worshiping God (see Ministry of Education, 2019).[2] But because teachers have been left on their own to determine what type of

[2] The use of the Ministry of Education in this document refers to the Ghana Ministry of Education.

Indigenous content to include in ECCD and how to do this, the curriculum is privileging DW-K over IKs. Most DW-Ks are easier to access because they are written in literature like the Bible. In contrast, there is no literature on Kasena Indigenous worship. Even the ECCD curriculum has no section showing how Indigenous Kasena worship is conducted. Hence, the pouring of libation, an important activity that connects the community of Boania to the land, is not taught.

Coupled with the fact that there exists no opportunity to invite Elders into classrooms to help teach IKs, Biblical contents are mostly taught at the expense of Indigenous African worship. Indirectly, the ECCD curriculum has made more room to privilege DW-K over IKs. Besides, this also contributes to the already existing belief that Indigenous worship is satanic and DW Christian religion is better (see Okeke, Ibenwa, & Okeke, 2017). In line with this, Sundar (2002 cited in McCarter, Gavin, Baereleo, & Love, 2014) cautioned that power imbalances can lead to discrimination against IEK.

Again, the ECCD curriculum emphasizes that children be taught their "origin and family history" (Ministry of Education, 2019, p. 125). As a result, teachers are to teach children to "sing indigenous songs, talk about and discuss the origin and history of the learners' family" (Ministry of Education, 2019, p. 125). But the curriculum does not contain any knowledge on the history of the community of Boania. Therefore, I observed that until the male Elder (who participated in this study) taught the history of the land and Boania Primary School, the Kindergarten two (KG2) teacher did not know about this history to teach the children. Leaving teachers on their own to figure out what IEK exists in their community, and how to incorporate it into their teaching privileges DW-K over IEK. Hence alternative methodological frameworks are needed to help weave Indigenous Knowledges (IKs) into formal education in Ghana. Kovach (2009) stated that "how we make room to privilege both, while also bridging the epistemic differences, is not going to be easy" (p. 29).

Therefore, in my research study, I adopted a two-eyed seeing methodology that gives equal importance to DW-K and IEKs in ECEE. This methodology also creates the opportunity to invite Elders, the true holders of the IEK into classrooms to teach children.

Additionally, the integration of IEKs into formal education in Ghana, thus far, has taken place mainly in higher grades and science courses (see Mueller & Bentley, 2009). But Indigenous ontology and epistemology (land education) affect all subject areas since they are taught in an integrated way which fits well with early learning programs. This research emerged to fill these research gaps – the need for a framework that gives equal power to different ways of knowing, to integrate a particular IEK into all subject areas in an ECEE setting.

1.4 Structure of the dissertation

Chapter one introduces the study and provides the justification for the study by pointing out the literature gap this research set out to fill. Equally, this chapter addresses the purpose of the study and the research question.

The next chapter is the literature review chapter which assesses the integration of EE into ECCD, DW domination of ECE, and the marginalization of Indigenous content. Also, this chapter gives a background to the study by tracing the history of ECE in Ghana. Arguing that there are increasing demands to integrate more Indigenous content into ECCD. The chapter proceeded to outline some of the benefits that will emerge when IKs are integrated into ECCD. Coupled with increasing environmental degradation, this demand has shifted towards IEK. However, the chapter concluded there is no methodological framework to guide teachers in integrating IEKs into ECCD.

Chapter three is the methodology of the study giving a detailed explanation of the two-eyed seeing methodology and the methods that were adopted to collect data. Furthermore, the methods chapter outlines how research participants were selected, data were collected, analyzed, and interpreted. Since this is a paper format dissertation, individual papers are organized into chapters.

Next, chapter four, drawing on data from the study, focuses on the integration of IEK into ECEE and what this means for practice. The chapter assesses the integration of Kasena's IEK

into ECEE and found it enhanced sustainability learning outcomes. Chapter five focuses on the two-eyed seeing methodological framework. The chapter found that not only does the two-eyed seeing methodology provide an opportunity for the two knowledges to be taught side by side, but it also serves as a framework to guide practice. Chapter six is the conclusion and recommendations.

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Contributions: John Bosco Acharibasam [conceived of the presented idea, collected, and analyzed data/ prepared/designed/drafted, reviewed the paper].
Dr. Janet McVittie [encouraged, / supervised the findings of this work/ edited and made suggestions].
John Bosco Acharibasam wrote the paper from his research, but both authors discussed the results and contributed to the final manuscript.

CHAPTER TWO - EARLY CHILDHOOD EDUCATION AND THE MARGINALIZATION OF INDIGENOUS CONTENT

2.0 Introduction to Early Learning and Environmental Learning in Ghana

In this section, I give a summary statement of the acronyms that will be used in this study. Environmental education is EE; early childhood education is ECE; early childhood environmental education is ECEE; early childhood education and care is ECEC; Ghana's term for early childhood education, early childhood care and development, is ECCD; Ghana Education Service is GES, the agency in charge of education; Indigenous knowledges is IKs; Indigenous ecological knowledges is IEKs. Also, I use the term dominant western knowledge (DW-K) to refer to the mindset, ontology, epistemology of the people of those countries (mainly Western Europe and North America) that have dominated economic systems in the last century.

Although differences exist between the terms Traditional knowledge and Indigenous knowledge, they share similar features and are often used interchangeably to mean the same thing (Bruchac, 2014). In this research, I use the terms 'Traditional' and 'Indigenous' to address decolonization even though I acknowledge the divided opinions surrounding their use. For example, the use of the term 'traditional' has come under scrutiny because it portrays IEK as static (McGregor, 2008). According to the scholar it "implies that the knowledge is static and confined to information gained in the past" (p.144). However, the scholar concluded "this form of knowledge is continually evolving and expanding to incorporate new information as part of adapting and responding to current challenges "(p.144). Seeing IK as dynamic "acknowledges the nature of knowledge, namely, that knowledge evolves and that it is socially constructed by people to address environmental needs and challenges (Maila & Loubserm, 2003, p. 277). Irrespective of the shortcomings associated with traditional, I adopt both Traditional and Indigenous ecological Knowledge in this research to mean a way of life (see McGregor,2005; 2008). According to Dei (2015), tradition is not static because it is about place-based knowledge which is about living and is a continual process.

I use the term “Elder” to mean adults, with in-depth knowledge of African Indigenous culture, traditions, and wisdom and who are representatives of the ancestors. In the African context, “elders are the representatives of the ancestors” (Ikyoive, 2017, p.94). As a result, they play a crucial role in communities. Elders are revered and carry a lot of authority in communities due to their close link to their ancestors. Brock-Utne (2001) also observed “elders have gained their authoritative influence through wisdom and experience” (p.3). Semali and Stambach (1997) stated “From birth, Africans are immersed in a cultural setting that values the authority of elders and emphasizes practical knowledge” (p.8). Adu-Gyamfi (2014) observed that “Ghanaian culture stresses reverence and deference to elders and authority at all times, as causing an adult to ‘lose face’ (embarrassed) is considered disrespectful” (p. 7). Age is a determiner of wisdom and intelligence. Based on this, Elders are held as a repository of knowledge and wisdom. Since they “have had sufficient experience of life and are ethically complete due to their own earlier training while children’s cognitive faculty for deliberation is not developed, children are not capable of choice” (Ndofirepi & Shumba, 2014, p. 238). Therefore, Muyila (2006, cited in Ndofirepi & Shumba, 2014) observed that advancing in age means continual improvement and accessibility to more knowledge and wisdom. Aubel (2010) stated Elders play a “central role played by elders in socializing younger generations, passing on indigenous knowledge and cultural values, and ensuring the stability and survival of their societies” (p.42).

There is an urgent need to introduce EE into ECCD, to prevent DW-K’s further domination and to help children develop an attachment to the natural world at a young age, especially, at this time that people’s attachment to nature is paling and failing (Pyle, 2003). Wilson (1994) argued that when young children interact with their natural environment it fosters “positive attitudes and values about the world of nature and a sense of responsibility toward the natural environment” (p. 23). As Barratt Hacking, Barratt, and Scott (2007) observed, to develop a relationship with and concern for the environment, early environmental experiences are important.

Ghana also acknowledges the importance of early interaction with nature. Based on this, EE has been added to the ECCD curriculum in Ghana as a learning area alongside traditional

areas such as numeracy and literacy (Ministry of Education, 2006, 2019). Thematic Unit 6 of the new Kindergarten curriculum (All Around Us) deals with EE topics (Ministry of Education, 2019). The aim is to develop in children "a strong sense of environmental, social, and economic awareness, with emphasis on protecting the environment" (Ministry of Education, 2019, p. vii).

The problem however is that Ghana's ECCD program privileges DW-K over Ghanaian Indigenous ways of raising children (see Abdulai, 2016; Ng'asike, 2014; Nsamenang, 2007; 2008; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008) and this is reflected in the type of EE integrated into the program. The EE program (under which ECEE falls) lacks Indigenous knowledge. The Ministry of Education through the Ghana Education Service incorporates EE into formal education using the Integrated Science curriculum for all levels of education (Global Environmental Education Partnership, 2019). The adoption of integrated science as an approach to integrating EE into classroom topics has resulted in too much focus on DW science to the neglect of IKs, particularly, IEKs.

Meanwhile, evidence suggests that IEKs have the cultural framework of love, respect, reciprocity, and responsibility towards nature (Kimmerer, 2012; Pierotti & Wildcat, 2000; Ritchie, 2012). Hence, they are best suited for early environmental learning which also aims at developing children's love for nature. Kimmerer (2012) for example, observed in the context of Canada that IEK "builds capacity for students in regaining a relationship with ecological systems which is based on indigenous principles of respect, responsibility, and reciprocity" (p.319). Similarly, Ghana possesses a wide range of IEKs which are still effective in helping conserve the environment (Arhin, 2008; Attuquayefio & Gyampoh, 2010). These can be incorporated into ECEE to help achieve sustainability in the country.

The United Nations International Children's Emergency Fund (2004) stated that every child has the right to a system of education that values their culture, language, and community without discrimination or hindrance. Similarly, the rights of children to education in cultural contexts familiar to them has also been backed by the conventions on the Rights of Indigenous People and the preservation of Indigenous Knowledge (United Nations, 2005). The justification

for this is that “culture plays an essential role in how children make sense of the world” (Cole, Hakkarainen & Bredikyte, 2010, p.1).

However, the current concept of ECCD that is practiced in Ghana (and sub-Saharan Africa more broadly), continues to privilege DW-K over Indigenous content. This has even led to tensions in ECCD practice (Acharibasam & McVittie, 2020). Hence Dei (2004) cautioned that efforts must be taken not to continue to promote DW-Ks over IK’s as the only valid knowledge in Ghanaian schools.

2.1 History of Early Childhood Education and Development in Ghana

To have a greater understanding of the current model of Early Childhood Education practiced in Ghana, it is prudent to examine the pre-colonial or Indigenous African educational system under which EE occurred in Ghana. Adu-Agyem and Osei-Poku (2012) observed that education in Ghana started way back in pre-colonial times and this form of education was informal and Indigenous knowledge and skills were passed on from the elderly to the youth by word of mouth or by way of apprenticeship. Pre-colonial education, also known as traditional African education or Indigenous African educational system (Boateng, 1983; Nsamenang, 2005), was a system of education based on African IKs accumulated over centuries in response to different challenges (Merriam, 2007).

Although there is diversity among the different African cultures, scholars have identified similarities in their educational systems across the board (see; Boateng, 1983; Boakye-Boateng, 2010; MacBeath, 2010; McWilliam & Kwamena-Poh, 1975; Nsamaneng, 2005; 2007; Tedla, 1995). Boateng (1983) for example concluded “African education, unlike the formal systems introduced by the colonialists, was inseparable from other segments of life” (p.322). Similarly, Nsamenang (2005) observed “children were encouraged to observe and learn from their involvement in the life of the family, cultural, and economic activities” (p. 329). The scholar further stated that this was practical and sometimes “done without formal instruction but with encouragement and support from family, peers, and the community” (p. 329). Based on this,

Fafunwa (1991) concluded that children learn by imitating family and community members in traditional African societies.

Education was based on ways of teaching and learning in Ghanaian IK accumulated over centuries in response to different physical, agricultural, ecological, political, and socio-cultural challenges (Boakye-Boateng, 2010; Boateng, 1983; MacBeath, 2010; McWilliam & Kwamena-Poh, 1975). According to MacBeath (2010), "education was an informal process through which Ghanaian communities prepared the next generation" (p.6). The scholar further stated that "the first school was the home; the teachers were the parents and Elders in the family" (p.6). Likewise, "the curriculum was life and learning was by observation and the first major purpose of such education was the inculcation of good character and good health in the young members of the community" (MacBeath, 2010, p. 6). The second purpose as observed by MacWilliam and Kwamena-Poh (1975, as cited in MacBeath, 2010) was to give young children "adequate knowledge of their history, beliefs, and culture, thus enabling them to participate fully in social life" (p.6). Again, Fafunwa (1991) observed that pre-colonial education was based on lived experience and the purpose of education was functionalism. Hence it prepared everyone for a particular profession (Adeyemi & Adeyinka, 2002).

Similarly, Nsamenang (2005, p. 322) stated this was an "informal education that prepared children for their responsibilities as adults in their communities". Education was in a form of "enculturation and socialization" (Nsamenang, 2005, p. 328), and the system was not rigidly compartmentalized, it was without walls, occurring outside of classrooms (Fafunwa, 1991). Also, it had the input of all members of the community (Adeyemi & Adeyinka, 2002). Nsamenang (2005) observed that under this educational model knowledge was co-owned and neither property nor an object which the teacher possessed.

In terms of curricula under the pre-colonial Ghanaian educational system, domains of knowledge were not divided into different disciplines (Nsamenang, 2005). The pre-colonial educational system integrated knowledge about all aspects of life into one curriculum. Knowledge was arranged in sequence to fit different stages of life, and "what children are made to learn fits their abilities" (Nsamenang, 2005, p. 330). Similarly, curriculum outcomes were

different. Commenting on this, Mundy-Castle (1975) observed that social competence was used to measure the intelligence of a child under this educational system. In support of this assertion, Weisner (1997) stated that children were socialized according to values, ethics, and norms that foster support for one another and nature from an early age. These values, ethics, and norms formed the basis for measuring intelligence (Weisner, 1997). Omolewa (2007) observed that traditional African education aimed to achieve a holistic individual, cultured and respectful.

Pedagogically, traditional African education employed local language, music, ceremonies, dance, oral tradition, proverbs, myths, stories, culture, and religion as methods of teaching (Omolewa, 2007). The pedagogical philosophy in traditional African education was informal and had relevance to the existence of the child within the cultural context (Boakye-Boateng, 2010). Onwauchi (1972) observed that through traditional stories, tales, and myths, the Elders taught children the moral codes of behavior and social relationships. However, the instruction was not formal but by example (Onwauchi, 1972). The method of teaching was practical and based on lived experience (Fafunwa, 1991). Similarly, Kovach (2010) comments in the case of Canada that Indigenous approaches to learning and knowing are experiential. Further, she points out that "I recognize that our doing is intricately related to our knowing" (p. 40). Likewise, Castellano (2004) observed that "traditional teachings are conveyed through example, through stories and songs in ceremonies" (p. 100). The mother tongue of a child was used as the language of instruction (Boakye-Boateng, 2010; Boateng, 1983; MacBeath, 2010; McWilliam & Kwamena-Poh, 1975). This kind of traditional ecological education is necessary within the context of formal education if IEK are to be integrated into ECEE.

Likewise, peers, family, and the community contributed to educating the child in traditional African society. Commenting on the role of the family in facilitating a child's education, Nsamenang (2005) stated that "a firm foundation for school learning is laid in the security of the home, long before the child enters school" (p. 332). By extension, the education of the child was the responsibility of not only the family but all members of the society (Boakye-Boateng, 2010). Peer groups played a significant role in a child's Indigenous education. Nsamenang (2005) argued that "From toddlerhood, typical African children begin to distance

themselves from their parents and increasingly come under the influence of the peer group" (p. 333).

Above all, the pre-colonial education fell under an Indigenous epistemological order of holism (Nsamenang, 2007). Fortunately, remnants of this type of education still exist in Ghana and elsewhere in Africa but current models of ECCD fail to consider the role pre-colonial educational structures can play in educating the child (Nsamenang &Tchombe, 2011). Based on this, scholars are questioning the model of ECCD adopted in Africa. Obanya (2011) for example concluded that education in Africa "predated schooling, that it is a lot broader and deeper than schooling" (p. xxv). Similarly, Maurial (1999) cautioned against reducing education to only schooling in Indigenous communities as it can break the holisticity of Indigenous worldviews. Hence schools must, therefore, find ways to include local IEK. Under the pre-colonial education system, there was limited influence from DW-K on early learning.

2.1.1 History of DW early childhood education in Ghana.

This section focuses on the DW ECE system which refers to educational programs that "focus on caring for and educating the whole child, from birth to school entry" (United Nations Educational Scientific and Cultural Organization [UNESCO], 2000, p.58). In Ghana, these programs focus on children from birth to 8 years (Ministry of Women and Children's Affairs, Ghana, 2004). Just like other African countries, Ghana's drive towards the adoption and expansion of the current model of Early Childhood Care and Development (ECCD) program began in the 2000s. This drive was influenced by several reasons but two stand out.

First is the pressure to meet commitments made to international organizations (Aidoo, 2008; Boakye et al, 2008; Garcia, Pence, & Evans, 2008; Morrison, 2012: Ng'asike, 2014). An example was, Ghana's commitments made "at the UN General Assembly Special Session on Children in 2002, to adopt and implement a comprehensive early childhood development policy, towards the realization of the global goal of creating a World Fit for Children by the end of the decade" (Ministry of Women and Children's Affairs, Ghana, 2004, para,5).

The second reason is to reduce poverty and better the lives of children (Ministry of Women and Children's Affairs, Ghana, 2004). The Ministry of Women and Children's Affairs,

Ghana (2004) concluded, “ECCD is also seen as a strategy for poverty reduction” (p. 3). The document goes on to state “considering the high levels of poverty in Ghana, and the several attempts being made to reduce it, this policy initiative is considered an opportunity to invest in young children as a means of addressing the problem” (p. 3). The expectation is “this will, in the long run, result in an improvement in the standard of living of Ghanaians” (p. 3).

Nonetheless, this is not to say there were no ECE schools in the country before the 2000s as the subsequent sections will show.

2.1.2 The colonial era (1880-1900).

According to Prochner and Kabiru (2008), the beginning of DW ECE in Africa can be traced back to the colonial era. The scholars noted that ECE was in the form of infant schools, kindergartens, and nurseries which mainly instilled DW ideas concerning race, childhood, and religion.

Specifically, in Ghana (formally known as the Gold Coast), the DW form of education or schooling started between the 16th and 19th Centuries by European merchants and Christian missionaries (Adu-Agyem & Osei-Poku, 2012; Boakye et al., 2008; McWilliam & Kwamena-Poh, 1975). Boakye et al. (2008) stated that the first school for young children was established in the Gold Coast in 1843. According to the scholars “in 1843, the Basel Missionaries first introduced day nurseries alongside their primary school classes…” (p. 170). This was even before Ghana officially became a British colony in 1901.

However, scholars observed that these schools were established by the merchants to get interpreters to facilitate their trade in gold and slaves as well as to spread Christianity (McWillian & Kwamena-Poh, 1975; Antwi, 1992). Besides, these schools were not accessible to all children. Children of African wives who married DW traders, the children of important chiefs, and wealthy merchants were the only ones admitted into these schools (Graham, 1971).

Although not enough, the colonial era saw the emergence of more ECE centers in Ghana, in the form of infant schools, kindergartens, and nurseries which were created alongside primary school classes. According to Morrison (2012, p. 214), “starting in 1823, several missions from abroad were established to convert the native population to Christianity”. The scholar went on to

state that "The colonial Ghanaian government, lacking money, ceded the responsibility of education to the missions" (p. 214). Hence the missions took on this task with the belief that schools were the best means of spreading Christianity (McWilliam, 1959). Morrison (2012) further opined that the first mission, Basel Mission Society, attached some kindergartens to their primary one classes in 1843 and several missions followed suit. The establishment of more ECE schools by the missionaries also came with the granting of access to children from all backgrounds.

However, the fact that ECE was left to the missions did not mean that the colonial government had no input at all in ECE. The curriculum was vetted by the colonial regime and it was not all subjects that could be taught. Commenting on this, Prochner and Kabiru (2008) concluded that most of these colonial ECE schools instilled mainly DW ideas concerning race, childhood, and religion. Also, the main purpose of these schools was to aid the colonial regime and "civilize" the African child to adapt to DW ways (Prochner & Kabiru, 2008). Consequently, civilization was determined to be achieved through the acquisition of DW-K which led to the downgrading of local culture (Prochner & Kabiru, 2008).

Unfortunately, this era marked the beginning of the marginalization of IKs particularly IEKs from ECE curricula. The influence of DW-K over early learning began during this era. As shown in the section on pre-colonial education, "education was informal and Indigenous knowledge and skills were passed on from the elderly to the youth by word of mouth or by way of apprenticeship" (Adu-Agyem & Osei-Poku, 2012, p. 165). Unlike, ECE under the colonial era, the Ghanaian Indigenous ECE related to the cultural realities of children. Owu-Ewie (2006) observed that before formal education was introduced into Ghana, education was conducted in the Indigenous languages.

2.1.3 The post-colonial era.

The post-colonial era witnessed the expansion of ECE schools in Ghana because the ones established under the colonial regime were few (Morrison, 2012). The colonial regime took initiatives such as the Sir Gordon Guggisberg Ten-Year Educational Development Plan of 1920 to expand education in the Gold Coast, but these were not enough. Kwame Nkrumah's policy of

Accelerated Development Plan which introduced the Free Compulsory Universal Basic Education (fCUBE) program saw the expansion of education across Ghana (Nyarkoh & Intsiful, 2018). Additionally, this era saw the involvement of the private sector in establishing nurseries and daycare centers. But the quality of these private ECE centers, later, became an issue for the government. Acquah (1958 as cited in Morrison, 2012), for example, stated that the conditions of some private ECE schools did not meet the high standards required by the government. Hence, to achieve quality in ECE centers across the country, the Education Act of 1961 was passed which "made preschools the responsibility of the Ministry of Education" (Morrison, 2012, p.215).

From there on "any facility that offered an educational program for young children was (with or without fees) required to register with the Ministry" (Morrison, 2012, p. 215). To further enhance quality, the Nursery and Kindergarten Unit and the National Nursery Teachers' Training Center were established (Morrison, 2012). The Nursery and Kindergarten Unit developed, registered, controlled, and evaluated nurseries and kindergartens whilst the National Nursery Teachers' Training Center trained staff and personnel for nursery and kindergarten (Antwi, 1992; Morrison, 2012; Oppong, 1993).

However, all these steps did not lead to an improvement in the general quality of education in Ghana as the 1970s witnessed a further decline in educational standards. This prompted the government to form a committee (Dzobo Committee) to investigate ways to improve educational standards in the country (Morrison, 2012). In 1974 the Dzobo Committee recommended among other things that to improve educational standards in the country, there was the need to establish kindergarten classes in all primary schools across the country (Morrison, 2012; Ministry of Education, 1974). All primary schools in the country were expected to have nursery schools attached to them and more teachers were to be trained in ECE.

Sadly, these recommendations were not acted on. Due to limited resources, ECE did not receive much attention from the government of Ghana until the 2000s. Commenting on this, Morrison (2012) observed that since the late 1980s, the government has passed no legislation that increased its financial support for early care and education in the country. Because the government had introduced a cost-free basic and tertiary education in the 1980s and 1990s

limited resources were left to focus on ECE (Morrison, 2012). Afenya (1999 as cited in Morrison, 2012) observed that kindergarten teachers were even pulled into upper primary classes. It must be noted that by this time ECE was not part of basic education in Ghana. Based on these, Asare (2015) concluded that Ghana previously did not pay too much attention to ECE in general.

Nonetheless, as indicated earlier on, all this changed in the 2000s due to major international events such as: the World Declaration on Education for All, the launching of the 2000 Millennium Development Goals (MDG's), and the introduction of the Education for All Monitoring Report in Dakar Senegal (Aidoo, 2008; Garcia, Pence & Evans, 2008). Likewise, another reason was the desire to improve and better the lives of the increasing child population in the country (Ministry of Women and Children's Affairs, Ghana, 2004).

Hence, Ghana adopted the current holistic Early Childhood Care and Development (ECCD) program in 2004 to provide a framework for Ministries, Departments, and Agencies (MDAs) to contribute to childhood development (Okai & Amoah, 2016). As well, the framework was to enhance collaboration between MDAs and stakeholders in providing integrated and well-coordinated services for the optimum development of the child (UNESCO's International Bureau of Education, 2006). For instance, the Department of Social Welfare became responsible for registration and maintenance of standards in all crèches and daycare centers for children aged 0-2, while the Ghana Education Service assumed the role of curriculum development for children aged 3-5 years (Okai & Amoah, 2016).

Before 2004 there was indecision about which ministry would be responsible for ECE in the country (Aidoo, 2008; Boakye et al., 2008). This was streamlined in 2004 because the government of Ghana realized that the scope of ECE lies beyond the confines of schooling since young children have multiple needs (UNESCO, 2006). Boakye et al. (2008) stated that a holistic government policy focusing on all development aspects of the child was therefore necessary. Hence the implementation of policies and programs to support ECCD was crucial for the development of children between 0 and 8 years of age (Okai & Amoah, 2016).

Agbenyega (2008) contributing to the debate indicated that Ghana adopted ECCD because of: the urgent need to address poor situations of children by providing access to early childhood services, an internal obligation to ensure the survival, growth, development, and protection of children as endorsed by the 1992 constitution of the Republic of Ghana, the need to retain enrolment and enhance the transition of children into primary school, as a strategy for poverty reduction, and the need to streamline fragmented activities of all early childhood service providers.

Consequently, in 2012 the government redefined the initial nine-year Basic Education program to include two years of kindergarten education making it eleven years of basic school education to promote proper management and transition of the child (Okai & Amoah, 2016).

On the issue of funding, too, the government took up the responsibility of providing part of the funding for ECCD. According to the Ministry of Women and Children's Affairs, Ghana (2004, p. 15)

> The Government, realizing that Early Childhood Care and Development forms an integral part of national development priorities shall, upon coming into force of this Policy, direct the Ministry of Finance, in its budgetary guidelines to the relevant sector Ministries, request for the retention of a certain proportion of their regular budgets for ECCD programmes.

In addition to the above, the Government will waive taxes on equipment and materials meant for ECCD programs, provide incentives to private sector establishments contributing above a certain minimum level of funds or in-kind support to ECCD programs, and direct the Ghana Education Trust Fund to contribute to ECE (Ministry of Women and Children's Affairs, Ghana, 2004).

Importantly, the adoption and expansion of ECCD in the 2000s happened with financial support from international organizations. As indicated in the Ministry of Women and Children's Affairs document on ECCD, “The implementation of the ECCD policy and programs will require financial outlays” (Ministry of Women and Children's Affairs, Ghana, 2004, p. III). Therefore, funding shall be sourced from diverse sources including parents, communities, private

proprietors/investors, Non-Governmental Organizations (NGOs), development partners, philanthropic organizations/ personalities, and the Government of Ghana (Ministry of Women and Children's Affairs, Ghana, 2004). Casely-Hayford, Palmer, Ayamdoo, and Thompson (2007) concluded that funding (grants, loans, aid, debt relief, budget support) for basic education in Ghana came from Development Partners such as; the Dutch and British Aid, World Bank, International Monetary Fund (IMF), Department for International Development (DFID), United States Agency for International Aid (USAID), Japan International Cooperation Agency (JICA), United Nations International Children's Fund (UNICEF), and African Development Bank (AfDB).

One major critique of the current model of ECE is that it has not done much to include African Indigenous knowledges and ways of raising children (Abdulai, 2016; Donkor, Issaka, & Asante, 2013; Hyde & Kabiru, 2003; Ng'asike, 2014; Nsamenang, 2007; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008; Pence & Shafer, 2006). Nsamenang and Tchombe (2011) for example observed recently, "Euro–American education models are promoted in a manner that suggests ignorance of the other heritages and a mistaken belief that African ways are incapable of educating healthy children" (p. 11).

Whilst efforts have been made over the years to expand and improve the quality of ECE, the inclusion of Indigenous content, particularly IEKs in ECE has not received much attention from the government. Even where attempts have been made to include Indigenous content in ECE, these have always focused predominantly on Indigenous language alone to the neglect of other dimensions of IKs. By highlighting the differences between the current ECCD and the traditional Ghanaian ways of raising children, the next section will show how DW-Ks are being privileged over IKs in ECCD.

Unfortunately, DW-K's domination over ECE gained prominence in this era. It started during the colonial era but was still limited since the number of formal schools were few. But with the expansion of schools during this era, DW-K gained more momentum. Learning became anchored on DW-K instead of IKs and schools became the centres for learning. Indigenous early childhood education in the pre-colonial era was in the family and community. Instead of the

community, Elders, family, and peers, the teacher became the educator of the child. English became the language of instruction instead of mother tongue. Again, instead of the land, curriculum and textbooks became the source of knowledge. To top it all curriculum divided forms of knowledge into different subjects to suit DW-K.

2.3 Differences between IK and IK Educational Approaches and DW-K and DW Educational Systems

The term "Indigenous educational system" is used here to refer to traditional African ways of raising children (see Nsamenang, 2005). However, this does not indicate that the ways different cultures raise children in Africa are uniform. Scholars (see Adeyemi & Adeyinka, 2002; Boakye-Boateng, 2010; Boateng, 1983; Fafunwa, 1991; MacBeath, 2010; McWilliam & Kwamena-Poh, 1975; Mundy-Castle, 1975; Nsamaneng, 2005, 2007; Nsamenang &Tchombe, 2011; Onwauchi, 1972; Taiwo, 1976; Tedla, 1995; Weisner, 1997) have noticed that although there exists diversity in the ways different African cultures raise children, there are more similarities than differences. Boateng (1983) for example concluded that "African education, unlike the formal systems introduced by the colonialists, was inseparable from other segments of life" (p. 322). He explained further that "Traditional African education was not only there to be acquired, but it was there to be lived" (p. 322). The table below shows the differences between the current ECCD in Africa and the Indigenous educational system.

Table 2.1 Differences between DW-ECCD and an Indigenous African Educational system

DW- ECCD	Indigenous/ traditional African Educational system
The process of education is synonymous with schooling because children go away from family, playmates, or groups to a specialized institution or school where they get the fundamentals of general knowledge and skills, and then	The processes of education are usually carried out by the family, peer group, Elders, and the community through initiation ceremonies, some forms of apprenticeship, and through the daily processes of existence (Dei, 2000; Onwauchi, 1972).

professional abilities (Nsamenang, 2005; Onwauchi, 1972).	
Education is organized into terms and classes (Onwauchi, 1972).	Education is organized into a sequence to fit different stages of life (Nsamenang, 2005; Onwauchi, 1972).
The process of school training is not integrated with the daily processes of life (Onwauchi, 1972).	Children are educated through the on-going processes of life in their traditional customs and values (Boateng, 1983; Onwauchi, 1972).
Pedagogy is formal, regimented, and schematized with adults teaching children (Onwauchi, 1972).	The pedagogy used is informal, hands-on, and by example (Fafunwa, 1991; MacBeath, 2010; Nsamenang, 2005; Onwauchi, 1972).
The curriculum divides domains of knowledge into different disciplines such as; environmental studies, religious studies, physical education, mathematics, among others (Nsamenang, 2005).	Domains of knowledge are not divided into different disciplines but rather integrated into one informal curriculum (Nsamenang, 2005).
Grades and values of individual achievement, personal ambition, and competition are used to measure intelligence (Nsamenang, 2007).	Social competence of family, cooperation, and sharing is used to assess the intelligence of a child (Mundy-Castle, 1975; Weisner, 1997; Nsamenang, 2007).
Guided by a DW epistemology and theories [such as Dewey, Montessori, and Reggio Emelia] (Abdulai, 2016; Ministry of Education, 2006; 2019; Nsamenang, 2007; Serpell, 1994).	Guided by an Indigenous epistemological order or Indigenous philosophies (Dei & Simmons, 2011; Nsamenang, 2007; Serpell, 1994).

DW-K and foreign languages are used in teaching (Nsamenang, 2007).	Indigenous Knowledge and mother tongue are used in oral teaching (Adu-Agyem & Osei-Poku, 2012; Nsamenang, 2007; Owu-Ewie, 2006).
Emphasizes a more democratic and friendlier student-teacher relationship (Abdulai, 2017; Arseven, 2014; Dewey, 1938; Edwards, Gandini, & Forman, 1993; Lillard, 2017; Ministry of Education, 2006, 2019).	Values discipline and the authority of the adult (Fafunwa, 1991; Ndofirepi & Shumba, 2014; Owuor, 2007).
A child is born with certain abilities (Arseven, 2014; Dewey, 1938; Fung, 2015; Lillard, 2017; Ministry of Education, 2006, 2019).	A child is a blank slate in need of protection and training to adulthood (Ndofirepi & Shumba, 2014).
Content including curriculum revolves around things of interest or helpful to the child (Weikart, 1971).	The community's interest takes precedence over the individual and children are raised based on the community's interest (Ndofirepi & Shumba, 2014).

The model of ECCD (its curriculum and pedagogy) that is currently practiced in Ghana, privileges DW-K over traditional Ghanaian ways of raising children. In line with DW-K binary divisions (see Kovach, 2009), ECCD curriculum divides forms of knowledge into different subjects, learning outcomes are measured on individual student's performances, the school has become the process of education, pedagogy is formal and rigid with teachers teaching children, school is organized into terms and foreign languages are used, sometimes complemented with mother tongue. Under the Indigenous African educational system, the teaching of IKs is oral, practical, by example, in mother tongue, and did not take place in a classroom: "Children were

encouraged to observe and learn from their involvement in the life of the family, cultural and economic activities" (Nsamenang, 2005, p. 329). Hence the way the conventional school system (in this case ECCD) is structured, privileges DW-Ks over IKs.

2.4. Reasons for DW-K domination of ECCD in Ghana

The first reason for DW's domination of ECCD in Ghana is the continuous influence of colonialism and globalization. Dei and Simmons (2011) argued that contemporary education is the reproduction of colonial hierarchies of power and knowledge. "From curricula to pedagogies, epistemologies have been localized to some governing Eurocentric paradigm, well steeped within colonial specificities" (Dei & Simmons, 2011, p.98). In line with this, Nsamenang (2005) asserted that education is an ongoing process and African governments have made efforts to change the educational systems they inherited from Europe. The scholar, however, says these changes are still inconsistent with African cultural realities. Similarly, Mazonde (2001) stated that "Decades of self-rule and independence have not succeeded in empowering Africans through enabling them to determine their educational framework" (p.1). Specifically, in the case of Ghana it has been observed that despite the attainment of political independence in 1957, Ghana's education system is still dominated by DW worldview and epistemology (Adjei, 2007; Dei, 2000; 2011).

Closely related to the above point is the influence of international and donor organizations. As stated earlier, to meet the demands of funding organizations, ECCD in Ghana (more broadly Africa) has been modelled along DW conceptions of ECE (Ng'asike, 2014; Nsamenang, 2008; Pence & Nsamenang, 2008; Pence & Marfo, 2008). DW-ECCDs are being held by international organizations (who mostly provide funding) as the standard and African ECCD's are held to the same standards (Nsamenang, 2008). To meet these standards and the expectations of funding agencies, ECCD curricula have been written to model those in the DW.

In the case of Ghana, Casely-Hayford, Palmer, Ayamdoo, and Thompson (2007) observed that over "20 multilateral and bilateral donors have been involved in Ghana's education sector since the reforms began in 1987" (p. 7). They went further to state that "the flow of donor

funds to education was dependent on Ghana fulfilling certain conditions set forth by the World Bank and IMF" (p. 8). The authors also observed that "the nature of the conditions varied from donor to donor, but some conditions are referred to as performance criteria, and the others are called structural benchmarks and prior conditions" (Casely-Hayford et al., 2007, p. 8). Palmer (2005) concluded that in Ghana "donors have traditionally had a certain degree of power over the formulation and implementation of the education sector policies" (p.39).

Besides, each of these organizations (World Bank, IMF) has different interests and objectives which may sometimes conflict with the receiving country's educational objectives. Palmer (2005), for example, showed how the World Bank "was able to exert pressure on the government during and after the 1986 reforms" (p.40). To the extent of even preventing the Ghana government from expanding secondary education too rapidly (Palmer, 2005). Ng'asike (2014) concluded that DW ideologies dominate ECCD because programs are driven and funded by the World Bank and other related multinational agencies, which sometimes disregard the uniqueness of each country.

Another reason why DW contents dominate ECCD in Ghana is because of the desire to achieve quality education in early learning. Herzog (2008 cited in Nsamenang & Tchombe, 2011) observed that over the years, African states have tried to make their curricula and pedagogies as much like the DW "but less African as possible on the assumption that doing so will make their education similarly productive" (p.7). Based on this, Serpell (1993 as cited in Pence and Nsamenang, 2008) argued that ECE services in Africa continue to push children into gaining DW-K and skills but alienates them from "their cultural heritage and life-journeys" (p.25). Likewise, Pence and Nsamenang (2008) concluded that ECE "in Africa is not really taking into consideration context" (p. 25). Mazonde (2001) opined that "today, Africa remains the world's poorest continent" (p. 1). According to the scholar, "there could be several reasons for this but one of the key ones is that education has not been relevant to the needs of the society" (p. 1). Likewise, Herzog (2008) observed that education does not reflect cultural realities because "many people in less wealthy nations regard life in the contemporary real world

of their own country as irrelevant to preparation for a better future, and thus wish to distance their children from it" (p. 102).

Again, the influence of the human capital theory explains why DW content dominates ECCD. Van der Merwe (2010) observed that the "core thesis of human capital theory is that education renders people more productive" (p.107). Scholars argued that investment in education would develop human capital (Becker, 1964; Schultz, 1961). Specifically, Campbell-Barr and Nygård (2014) argued that "human capital theory is the dominant rationale for investing in ECEC" (p.346). Therefore, ECE is viewed as "an instrumental, frontline strategy for achieving poverty reduction goals" (Arnold, 2004, p. 2). Hence, the belief that education will lead to poverty reduction and development is another reason why DW content dominates ECCD in Ghana. Nsamenang and Tchombe (2011) argued that there is a strong conviction that formal education of any kind would provide the needed "economic growth and societal development in Africa" (p.7). Also commenting on this, Dei and Simmons (2011) concluded that even school curriculum is contoured to meet the needs of DW "development and modernization" (p.99). Meanwhile, IKs including IEK are seen as anti-development and hence cannot be included in school curricula (Onwauchi, 1972; Taiwo, 1976).

According to the government of Ghana's policy on ECCD, "ECCD is also seen as a strategy for poverty reduction" (Ministry of Women and Children's Affairs, Ghana, 2004, p.3). The document goes on to state "considering the high levels of poverty in Ghana, and the several attempts being made to reduce it, this policy initiative is considered an opportunity to invest in young children as a means of addressing the problem" (p.3). The expectation is "this will, in the long run, result in an improvement in the standard of living of Ghanaians" (Ministry of Women and Children's Affairs, Ghana, 2004, p.3). Capturing this view, Agbenyega (2008) argued "Ghana's commitment to better the economic conditions of children and parents is evident in its push for ECCD" (p. 403).

Again, Aizenman and Warner (2018) observed that even parents with extremely low incomes are putting their children in expensive ECE centers at younger ages with the hope that jobs will open for them in the future. Likewise, donor support for Ghana's education is tiered to

poverty reduction. Commenting on this, Casely-Hayford et al. (2007) observed that donors can stop funding if the country veers significantly from its poverty reduction objectives. Regrettably, this theory continues with the colonial agenda of downplaying the significance of IEK to education (United Nations Environment Program, 2012), because IEK is seen as anti-development, anti-progress, backward, and may hold back development (Onwauchi, 1972; Semali & Kincheloe, 1999; Taiwo, 1976).

Nonetheless, there is an increasing recognition that to achieve a better ECCD, there is the need to integrate more Indigenous content into the program (Abdulai, 2016; Donkor et al. 2013; Tackie-Ofosu et al., 2015). Coupled with increasing rates of environmental degradation, the call to integrate Indigenous content into ECCD has gravitated towards IEKs, which are believed to enhance more sustainable environmental behavior in children.

2.4.1 The demand for Indigenous content in ECCD in Ghana.

The demand to Indigenize education in Ghana is not a new issue. This began during the colonial era when parents agitated against the neglect of mother tongue in colonial schools, curriculum being saturated with Biblical content to the neglect of social realities, and the banning of Ghanaian cultural practices in schools because they were viewed as satanic (Aboagye, 1997; Graham, 1971). This was further solidified during the struggle for political independence from British colonial rule. The struggle for political independence was led by Nkrumah, despite whose efforts education in Ghana was not decolonized. Independence in 1957 did not bring about the decolonization of education as DW-K continues to dominate Indigenous content (Adjei, 2007; Dei, 2004). Mensah (2005) attributed this to the residual effects of colonialism. According to him the "independence attained by former colonies is cosmetic rather than real" (p. 23). Nonetheless, recent times are beginning to witness many Ghanaians supporting the Indigenization of ECCD (Tackie-Ofosu et al., 2015). People are beginning to realize that education is more than just attaining DW "knowledge that allows one to access wage-employment" (Adjei, 2007, p. 1048).

First, this realization comes about because of the emergence of a global demand to decolonize education coupled with the introduction of Indigenous research methodologies.

Akena (2012) argued that European colonizers projected DW-K as superior to other forms of knowledges and imposed it as the only legitimate knowledge around the world. Similarly, Shiva (2000) concluded "colonialism has from the very beginning been a contest over the mind and the intellect" (p. vii). The scholar went further to state that DW-K has always determined "what will count as knowledge" (p. vii). However, Indigenous Peoples and people in low-income countries whose knowledges have been marginalized and labeled as inferior are beginning to question DW-K's privileged position as the only legitimate knowledge in education (see Eshun, 2011; Kovach, 2010; Smith, 1999; Wilson, 2008). Not only are questions being asked about DW-K itself but how it is produced has also come under scrutiny. Based on this, Indigenous scholars have introduced Indigenous methodologies to help in knowledge production. These global actions also impact Ghana and broadly Africa. For example, Khupe and Keane (2017) argued that the need for Indigenous research methods in Africa emerged in response to inappropriate DW paradigms of research in the African contexts. Similar reasons have been outlined for the emergence of Indigenous methodologies in the developed world context (see Kovach, 2009, Wilson, 2008, Smith, 1999). In the case of Ghana Adjei (2007) noted "Despite the attainment of political independence on March 6, 1957, Ghana's schooling and education system is still dominated by Euro-American canon, worldview, and epistemology" (p.1047). Therefore, the decolonization of education and research in Ghana and Africa is an issue that is gaining attention (see Adjei, 2007; Dei, 2000; Eshun, 2011; Khupe & Keane, 2017; Okolie, 2003; Mkabela, 2005).

More importantly, DW-K attained by children in schools has failed to connect them to nature and to solve local problems (especially environmental problems) because the content taught does not reflect local realities. The current educational system has confined children to classrooms, and they are "separated from their culture and environment" (Abah, Mashebe, & Denuga, 2015, p.669). Adjei (2007) concluded, "the inability of the school system in Ghana to contextualize standards and excellence to needs and conditions of the local people has resulted in an intelligentsia with little or no relevant skills and knowledge to address needs within their local communities" (p.1048). The more formal schooling children receive the more they become "alienated from their indigenous traditions and communities of origin" (Herzog, 2008, p.99).

Importantly, Mueller and Bentley (2009) showed how this disconnection between school and students' lives is discouraging students from pursuing science and environmental education. This has led to the concern of "Ghana's dependence on experts from other countries to investigate local environmental problems" (Mueller and Bentley, 2009, p. 56).

Besides, unlike IEK which is a way of life (see McGregor, 2005) with cultural principles of love, respect, and reciprocity towards nature, DW-K as currently taught in ECCD involves "abstract understandings of nature" (Seawright, 2014, p. 570). This does not connect children to nature. Therefore, people have realized that their IEKs, which mainstream schools have marginalized and labeled as inferior are rather helping them cope with several environmental challenges and to live sustainably. For example, Boafo et al. (2016) observed that in the face of no early warning systems from climatologists, rural communities still relied heavily on IEK to prepare for floods and droughts in Northern Ghana. Likewise, Adom (2018) concluded that natural resource conservation in the Bomfobiri Wildlife Sanctuary was successful due to the people's IEK. Again, McPherson et al. (2016) showed how IEK even helped in the discovery of the "sitatunga (*Tragelaphus spekii gratus*), a species familiar to locals, but not previously scientifically recorded in Ghana and regionally assumed extinct" (n.p). Therefore, people are beginning to ask why these important knowledges are not taught in schools.

Another reason is the increasing rates of graduate unemployment associated with formal (DW) education (Adjei, 2007; Dei, 2004). Formal education based on DW-K comes with inherent promises for white-collar jobs, usually in urban areas but these jobs are rare (Ng'asike, 2014; Nsamenang & Tchombe, 2011). DW educational system in Africa trains children for jobs that do not exist. Adeyemi and Adeyinka (2002) argued that the unemployment problems that exist on the continent emerge from the over-reliance on DW education. As a result, there are calls to Indigenize education because IKs (such as farming, traditional gardening, shea butter processing, or wood carving) prepared each individual for a particular profession or occupation (Adeyemi & Adeyinka, 2002). Therefore, calls for Ghana to Indigenize education including ECCD are increasing. Donkor et al. (2013) found out that parental support for children's

education in the Weija community increased when programs went beyond mother tongue to include other dimensions of IK in the curriculum.

But there is a concern that too much Indigenizing of education may compromise quality, and lead to poor performance (Adjei, 2007; Owu-Ewie, 2006). The Statesman, Thursday, July 16 (2002 as cited in Owu-Ewie, 2006) observed that Ghana education service had to stop the use of mother tongue in ECE before the 2000s because "The previous policy of using a Ghanaian language as the medium of instruction in the lower primary level was abused, especially in rural schools" (p. 78). The paper went on to state that "Teachers never spoke English in class even in primary six" (p.78). As a result of this "Students are unable to speak and write 'good' English sentences even by the time they complete the Senior Secondary School (High School)" (p. 78).

On one hand is the general belief that the Indigenization of ECE, would preserve cultural identities, decolonize ECE, connect learning to children's realities, help children learn a second language (English), and help children understand concepts taught in schools (Ministry of Education, 2006; Owu-Ewie, 2006; Tackie-Ofosu et al., 2015). On the other hand, however, is the concern that too much Indigenization of ECE, would compromise the quality of education, prevent children from learning the English language, make children less competitive globally, and fail to land children in white-collar jobs promised by DW education (Adjei, 2007; Herzog, 2008; Nsamenang & Tchombe, 2011). Commenting on this, Adjei (2007) concluded that DW-K has become "the cultural capital by which individuals could access employment in both state and private organizations in Ghana" (p.1048). The scholar went on to state that "I concede that because of material rewards that come with colonial education, it is quite difficult to ask local learners to abandon Western knowledge" (p.1050).

To balance these issues, Ghana's Indigenization efforts have always been limited to mother tongue and do not go deep enough to include other dimensions of IKs. Nonetheless, scholars have called for efforts to go beyond the use of mother tongue in ECCD to include other dimensions of IKs in curricula and pedagogy (Abdulai, 2016; Adjei, 2007; Dei, 2004; Donkor et al., 2013) because mother tongue can be used but the content taught may still exclude other important aspects of Indigenous knowledge. The British colonial administration used mother

tongue in education, but teaching did not include other Indigenous content. Hence, although the mother tongue is used, DW-K values and subject matter still dominate ECCD curricula (see Abdulai, 2016).

However, given the current levels of environmental degradation in the country and the realization that Indigenizing education will allow many Ghanaians to participate "fully in ecological decisions that sustain natural resources for the future" (Mueller & Bentley, 2009, p. 56), the demand for Indigenous content has gravitated towards incorporating IEK into environmental education (see Mueller & Bentley, 2009). But this integration has taken place mainly in upper grades (high school) and in science education. As result, ECEE is still dominated by DW-K. Being holistic, Indigenous ontology, and epistemology fit well with early learning programs.

2.4.2 Indigenous ecological knowledge (IEK) of the Kassena ethnic group.

IEK focuses on how communities have learned from time immemorial how to live in and with their ecosystems (Kim, Asghar, & Jordan, 2017; Schafer et al., 2004). Snively and Williams (2016) argued that IEK does not represent the entirety of IKs and should be seen as a sub-set of the broader categories of IKs. African IEKs are sub-sets of African Indigenous knowledges and are comprised of a wide range of understandings of ecosystems and traditional modes of agriculture (Obiora & Emeka, 2015). They represent beliefs about and attitudes towards the environment expressed through myths, symbols, stories, proverbs, songs, taboos, and rituals, most of it in oral history (Gitau, 2000). Parrota and Trosper (2012) further stated that three ideas form the basis of IEK and these are: reciprocity should guide human relations, non-humans have consciousness, and humans are permanently connected to their place. Also, IEK "is socially-differentiated according to gender, age, occupation, socio-economic status, religion, and other factors" (Gregoire & Lebner, 2001, para.3). In short, IEK encompasses different aspects of the human-nature relationship, but what is common is a belief in caring for all entities, not just humans, in particular places. Under African IEK, humans are not more important than other forms of creation (see Darko, 2014). Hence, IEK enhances the cultivation of healthy habits

towards nature because it possesses a cultural framework of respect, reciprocity, and responsibility towards nature (Pierotti & Wildcat, 2000; Reid et al., 2002).

The IEK presented here was verified by the two Boanian Elders who took part in this research to be a true representation of their knowledge. Kasena words are therefore used in order not to separate the knowledge from its context (see Simpison, 2001). The community chosen for this study (Boania) possesses a cultural framework of respect, reciprocity, and responsibility towards nature. This can be found in their understandings of ecosystems, cultural, religious, and farming practices. According to Obiora and Emeka (2015), African IEKs are mostly found in people's understandings of ecosystems, cultural practices, and traditional modes of agriculture. In Boania / Paga, paramount among these are the people living in harmony with their sacred crocodiles (locally called Yingo), with neither hunting the other (Arhin, 2008). The people of Boania have a strong relationship with crocodiles which they worship and hold as totems. This relationship has even been acknowledged and endorsed by conservationists. In the light of inadequate legislation on conservation in Ghana, Arhin (2008) concluded that cultural practices such as the Paga-crocodile relationship are highly effective in conserving biodiversity in Ghana. Based on this, Attuquayefio and Gyampoh (2010) argued that the introduction of DW-style conservation systems should consider cultural practices such as the Paga-crocodile relationship.

Kimmerer (2002) observed that IEK has "an ethic of reciprocal respect and obligations between humans and the nonhuman world" (p. 434). In terms of responsibility towards nature the Kasena belief that the earth (locally known as Katiga) must be treated gently. They have a proverb that says it is in recognition of Katiga's fragile nature that the chameleon walks slowly and gently in order not to harm her (Awedoba, 2000). Humans must, therefore, learn from the chameleon on how to treat Katiga. As well, the community has sacred groves which they see as habitats for the gods and it is forbidden to cut wood from these groves; in addition, some trees are regarded as gods; there are days when farming and hunting are forbidden (see Atuguba, 2018). According to Darko (2014, p.191), the use of these gifts "without the approval of the ancestors and gods, who are usually represented by traditional priests, priestesses, or chiefs is not acceptable". Again, the community begins and ends farming seasons with rituals seeking consent

from their ancestors. All these traditional practices have been put in place to check the behavior of community members towards the environment.

Like other ethnic groups in Africa, the Kasena have a deep spiritual connection and respect for the land that involves both the living and the dead. Therefore, spiritual connection to the land and nature is particularly important to the community. As Darko (2014) concluded, "among Indigenous communities, especially in Africa, spirituality constitutes a major pillar of self-identity and community well-being" (p.186). For example, just like Nkosi's (1999) description of the Zulus of South Africa, the umbilical cord of a newborn baby and the foreskin of a circumcised boy are buried on the family land. Ancestors (dead) are also buried on the same land (Nkosi, 1999). The connection with the land, therefore, extends beyond the living and it is believed that a person is connected to the land permanently. In line with this Mazrui (1986) stated that the family's land is the piece of earth from which one comes, and onto which one will return and thus, this defines a person.

To emphasize this point, Nkosi (1999) observed that without land, there would be no home for a dead body. The scholar further commented that this is why Indigenous Africans in Southern Africa kneel barefooted next to the grave when they want to communicate anything to their ancestors, showing respect for the land on which their ancestor lies. Nkosi (1999) noted that in the event of a death in the family or community, no one is allowed to till the land even after the funeral because a ritual of cleansing has to be performed. The Zulus, for example, do not till the land for a year when a member of a royal family passes away (Nkosi, 1999). These same cultural practices are observed by the Kasenas of Boania.

Perhaps the most convincing cultural practice that shows the Kasena's relationship to nature is in the naming of children. The Kasena name their children after natural weather conditions. A child born on a rainy day is called 'Adoa' (meaning my rain) whilst the one born on a sunny day is called 'Awiah" (meaning my sun). From these names and the dates of birth, climate experts can easily track changes in rainfall patterns in the community.

In terms of agriculture, people are still heavily dependent on the land and traditional farming practices for their survival, and peasant farming is the main occupation. As Boanian

Elder, Awariwe, further confirmed, “the people farm to sustain themselves, they are not known for trade, manufacturing or industrial work” (male Elder interview [1] transcript, January, 27th 2020). They live on the land and its natural resources which include: the land, trees, animals, water bodies, and the air. Parrota and Trosper (2012) observed that IEK survival is at risk when there is a reduced dependence on the land for rural survival. But in the case of Boania, the community is still heavily reliant on the land and nature for survival. As articulated by Githiru (2007), “There is a great deal of resilience in Africa, and there is also real hope for the environment because many rural people still rely directly on it” (p. 1210).

2.4.3 What integrating IEK into ECEE means for practice in Ghana.

Integrating IEK into ECEE reflects Ghana’s two ways of seeing. An important reason why IEK is integrated into ECEE is that it reflects Ghana’s reality as there are two ways of seeing. Since Ghana and the rest of Africa encountered Europe, the continent no longer has a unitary way of seeing reality. Bhabha (1985) for example concluded that post-colonial Africa does not have a unitary set of discourse about education but rather a hybrid, a third space where local African and DW images meet in weaving that has its own implications and configurations. Likewise, in the Ghanaian context, there exists a heterogeneous knowledge system (Adjei, 2007; Dei, 2000). In Africa, two ways of seeing are even more evident in schools where Le Grange (2007) observed “schools are the sites where most learners first experience the interaction between African and Western worldviews” (p.581). Based on this, Onwauchi (1972) concluded that the typical African child lives in two worlds, “the school environment, and the home environment” (p.243). These two worlds represent the two ways of seeing (Indigenous ways and western ways) that many students in Africa struggle with, from the beginning of formal schooling. Jegede (1995) observed that students are required to function in these two worlds: the traditional world and that of science. Hence “the differences in the worlds would require them to move back and forth from one worldview to another” (Fakudze & Rollnick, 2008, p.80).

Nonetheless, DW ways of seeing are being promoted more and even dominate Indigenous ways of seeing in Ghanaian schools (Adjei, 2007). Onwauchi (1972) pointed out that, “In the basic early formal school training of the African peoples today, there is an obvious

dynamic of discontinuity between what is taught in school and the home life of the pupils" (p.242). Specifically, in ECCD, DW-K dominates Indigenous content (Pence & Marfo, 2008; Nsamenang, 2008). Commenting on this, Pence and Nsamenang (2008) concluded that "ECE in Africa is not taking into consideration context" (p. 25).

As a result of this, scholars suggest that Ghana finds ways to prevent the continuous promotion and domination of education by only DW ways of seeing. Therefore, it is suggested that Indigenous African ways of seeing and DW ways of seeing both be taught in schools (Adjei, 2007; Gyekye, 1996; Jegede, 1994; Ndofirepi, 2011). Kanu (2007) for example recommended that efforts must be made to find abiding links that connect IK and DW-K in education. Likewise, Gyekye (1996) suggested that there are many positive cultural values and practices of traditional Africa that can be considered and accommodated in the scheme of African modernity.

Furthermore, the inclusion of IEK helps resist DW domination of ECEE curriculum and pedagogy. Le Grange (2005) concluded "in (post)colonial Africa, all spheres of life are threatened by new forms of colonialism" (p. 35). Likewise, the United Nations Environment Program (2012) suggested that colonial education system structures and contents continue to marginalize IEK and ways of knowing that are culturally situated in African socio-ecological contexts. Specifically, Dei (2011) concluded "contemporary education in West Africa is mired in the reproduction of colonial hierarchies of power and knowledge and is struggling for local relevance" (n.p). Currently, DW values have dominated Indigenous content in ECCD (Pence & Marfo, 2008; Nsamenang, 2008). There are therefore calls to resist this continuous domination of ECCD by DW values.

Based on this, scholars argue that the inclusion of Indigenous content in curricula and pedagogy help unsettle and resist DW-K domination of ECCD (Dei, 2004; 2011; Dei and Simmons, 2011; Nsamenang, 2007). Dei and Simmons (2011) for example concluded: "part and parcel of indigenous knowledge, is resistance, survival; it is about operating counter-hegemonic to colonial Western forms of knowledge" (p.109). Similarly, Ritchie (2012) concluded that the inclusion of Indigenous ecological perspectives in ECE is necessary to provide a valid counter-narrative to the DW techno-industrial emphasis that continues to damage our planet.

Nonetheless, Le Grange (2005) cautioned that in our efforts to resist DW-K domination "Africans need to (re)invent new ways of living in order to meet the challenges presented by the continent's many and complex problems, but that this cannot be achieved by invoking old formulae (including cultural values) that were appropriate when the world was a different place" (p. 35). This reinvention of new ways involves finding a space to connect IKEs and DW in a balanced way in schools. By adopting a two-eyed seeing methodology in the study, it provided the framework and space for IEK and DW-K to coexist in ECEE.

Next, IEK helps achieve environmental sustainability. Ritchie (2012) argued that IEK in ECEE enhances the cultivation of healthy habits towards nature. IEK possesses a cultural framework of respect, reciprocity, and responsibility towards nature (Kimmerer, 2012; Pierotti & Wildcat, 2000). Based on this Kimmerer (2012) observed IEK "builds capacity for students in regaining a relationship with ecological systems which is based on indigenous principles of respect, responsibility, and reciprocity" (p.319). Reid et al. (2002) also concluded that when integrated into EE, IEK can enhance learning attitudes and values for a sustainable future. This is because IEK, for its focus on how communities have learned from time immemorial on how to live in and with their ecosystems, is integral for children to learn (Kim, Asghar & Jordan, 2017; Schafer et al., 2004).

Besides, the integration of IEK into ECE takes environmental education outdoors, consequently, leading to love and respect for nature in children. Research has shown that constant interaction with nature is one way of instilling in children love and respect for nature (Ärlemalm–Hagsér, 2013; Burdette & Whitaker, 2005; Sobel, 1996; Wells & Evans, 2014; Wilson, 1996; Zamani, 2016). For example, Wilson (1996) argued that young children must interact with their natural environment to develop positive regard for the environment and flourish as healthy individuals.

Inclusion of IEK as a source of respect and value for Indigenous people and their knowledge. In the context of Africa, the process of colonization was also a process of dehumanization. As a result, Indigenous Peoples and their worldviews have not only been marginalized but devalued and downgraded (see; Maila & Loubser, 2003; Ngozi & Duruji, 2013;

Ntuli, 1999; Onwauchi, 1972; Taiwo, 1976). Commenting on this, Semali and Kincheloe (1999) noted that the term Indigenous and the concept of IK are often associated with primitiveness from the DW viewpoint. This, according to the authors, has evoked little appreciation for the insight and understanding indigeneity has to offer. Similarly, Onwauchi, (1972) observed that people perceive African IKs as backward and primitive from the DW viewpoint. Further, Taiwo (1976) stated that school does not consider Africa's culture because it is seen as an obstacle to school and modernity; school is, therefore, the gateway to escape from this backwardness and anti-development attitudes. Maila and Loubser (2003) were even more succinct in their conclusion to their study of the role of IK in environmental education in South Africa: "This knowledge is accorded low status because it belongs to a particular racial or ethnic group which often, it is assumed, lacks the necessary cultural capital" (p. 276).

Therefore, the inclusion of IEK in ECEE helps decolonize the program and create respect for Indigenous people and their knowledge (Sheya, 2014). Kimmerer (2012, p. 319) concluded that the integration of IEK into EE "builds an appreciation for intellectual pluralism, respectful consideration of other ways of framing, and addressing" environmental question. Additionally, it gives more rights to Indigenous People in the education of their children. Seeing that, it creates the opportunity to use IEK holders (Elders) in the community who have often been marginalized by mainstream schools as teachers (Sheya, 2014). Given the stratified nature of IEK (Gregoire & Lebner, 2001), IEK in ECE involves the expertise of multiple teachers. Currently, IEK is socially differentiated according to gender, age, occupation, socio-economic status, religion, and other factors (Gregoire & Lebner, 2001).

IEK should be preserved as part of global cultural heritage. IEK is rapidly diminishing worldwide due to the failure to transmit this knowledge to younger generations (Marzocch, 2006; Parrota & Trosper, 2012; Ruddle, 1991). Hens (2006) concluded "in the contemporary fast-changing societies of sub-Saharan Africa IEK is less and less applied and at risk of disappearance" (n.p). In the case of Ghana, researchers have also observed a decline in the transmission of IEK to younger generations. Boafo et al. (2016) observed that in the rural communities of northern Ghana the elderly people are likely to be aware of and comply with IEK

systems than younger generations. Hence, the integration of IEK into ECE helps prevent this important knowledge wave from being lost in the community of Boania. Commenting on the value of IEK, Mazzocchi (2006, p. 465) argued that "Traditional environmental knowledge is an important part of humankind's cultural heritage" and it would be disastrous to allow this cultural heritage to disappear. Similarly, Ruddle (1991) concluded that IEK has significantly proven itself in the management and conservation of renewable natural resources and must be taught to younger generations.

2.5 The Lack of a Methodological Framework

The problem however is that there is no methodological framework to guide the integration of IEK content into ECEE. Ghana Education Service, the agency in charge of education has not specifically provided any framework like the two-eyed seeing approach or land-based principles to guide practice. Hence teachers have been left on their own to figure out what types of Indigenous content to incorporate into ECCD and how to do it. For example, it is realized that children enter Kindergarten with Indigenous knowledges from the home and community at large. As a result, the ECCD curriculum urges teachers to identify these knowledges and to incorporate them into classroom lessons (Ghana Ministry of Education, 2006). But teachers are not told what types of Indigenous knowledges and how this should be done. They have been left on their own to figure out how to incorporate Indigenous content into ECCD in a schooling system that is structured to privilege DW-K over Indigenous knowledges. Given that IKs are not easily accessible in textbooks, teachers are not trained on IKs and teaching philosophies, and there is no avenue to invite Elders into classrooms, DW-K is still being promoted over IKs. In line with this, Dei and Simmons (2011) argued that "educational philosophy emerged through the material presence of the written text, consequently forming hegemonic relations with indigenous ways of knowing" (p 109).

Turner et al. (2000) argued that for IEK to be incorporated into any program, the complete context of IEK, including its philosophical bases, must be recognized and respected. Similarly, Simpson (2002) asserts that it must be recognized that "Indigenous Knowledge and Indigenous education philosophies on their own terms are valid ways of teaching and learning,

equal to their Western counterparts" (p. 17). Therefore, scholars cautioned that care must be taken when putting two knowledge systems together, because one of them may be dominated by the other (Kim et al., 2017).

In line with this, Kim and Dionne (2014) suggested that it is essential to create a venue for true experts to share their knowledge directly with learners. By that, the scholars propose the invitation of Elders who are the true holders of IEK into classrooms to teach children. Likewise, Dei (2000) suggested the hiring of Indigenous scholars to "join teaching faculties and to integrate Indigenous knowledges into the curriculum, as well as into the instructional and pedagogic practices of educators and learners" (p.119). Kimmerer (2002) on the other hand recommended that either IEK be included as a new topic on its own or integrated as examples into teaching material of existing topics. Unfortunately, none of these have happened with ECCD in the Ghanaian context.

2.6 Conclusion

The chapter focused on DW-K dominance over both ECCD as well as ECEE and highlighted some of the reasons. Importantly, I argued for integrating IEK into ECEE and provided reasons to support this call. Below is a summary of these reasons.

The first and most important reason is that it will help achieve environmental sustainability. With its cultural framework of love, respect, reciprocity, and responsibility towards nature, IEK is best suited to develop children's love towards nature. Ritchie (2012) argued that IEK in ECEE enhances the cultivation of healthy habits towards nature.

Second, integrating IEK into ECEE reflects Ghana's dual knowledge base. Having been colonized by Britain, there are now two forms of knowledge, that is the DW-K and IKs (also referred to as two ways of seeing) in Ghana. Thus far DW-K dominates IK and continues to be privileged in schools. It is, therefore, necessary for both forms of knowledge are taught in schools to help children make informed decisions.

The third point is that the inclusion of IEK helps decolonize and resist DW domination of ECEE curriculum and pedagogy. As noted in the second point, DW-K continues to dominate,

downgrade, and marginalize IK in ECEE. Hence the inclusion of IEK in ECEE helps decolonize the program and create respect for Indigenous people and their knowledge.

Last, it helps preserve IEK as a cultural heritage. IEK is rapidly diminishing worldwide due to the failure to transmit this knowledge to younger generations (Marzocchi, 2006; Parrota & Trosper, 2012; Ruddle, 1991). The preservation, recovery, and renewal of these sustainable traditional and non-capitalist cultural behaviors are important if environmental sustainability is to be achieved (Bowers, 2001; Gruenewald, 2003).

Nonetheless, the study does not call for the complete rejection of DW-K as both knowledges are important. According to Le Grange (2005), IKs alone cannot solve the complex problems faced today. As a result, DW-Ks are needed. But right now, IEK is considered inferior to DW-K and with no methodological framework for integrating Indigenous content into ECCD in Ghana, DW-K is being privileged over IEK. That is why this study adopted a two-eyed seeing methodology which puts value on both forms of knowledge.

The overall purpose of this study was to examine how IEK can be integrated into ECCD curriculum and pedagogy without further privileging DW-K in Ghana, with the intention of determining if IEK could help resist the continuous domination of ECCD by DW content. The main research question was how a two-eyed seeing approach could help integrate IEK into ECCD to resist DW domination of ECCD in Boania Primary School, Ghana.

CHAPTER THREE - METHODOLOGY

3.0 Introduction

This research adopted a two-eyed seeing Indigenous methodology and a qualitative case study approach under the overarching guidance of postcolonial theory and an Indigenous research paradigm. DW-Ks currently dominate Indigenous content in ECE. Similarly, research in the Ghanaian (and more broadly African) context is dominated by DW methodologies (see Adjei, 2007; Khupe & Keane, 2017). As a result of this, a two-eyed seeing Indigenous methodology and a qualitative case study approach were adopted because they allowed for diverse perspectives. In this study, the methodology is anchored on Kasena's IEK and the method of knowledge sharing aims at resisting DW domination, creating respect for IEK, decolonizing ECE, valuing relationality, and viewing meaning creation as social, subjective, and experiential. According to Castellano (2004), an Indigenous paradigm views truth as relative and dependent on one's perspective. Hence this research is based on the IEK of the Kasenas of Paga Buru Boania in Ghana.

3.1 Methodology

3.1.1 Two-eyed seeing methodology.

A two-eyed seeing decolonizing methodology was adopted to explore how IEK can be integrated into the curricula and pedagogy of ECEE in Boania Primary school, in the Upper East region of Ghana. This methodology is "an inclusive philosophical, theoretical and methodological approach" (Marsh, Cote-Meek, Toulouse, Najavits, & Young, 2015, p. 3-4), because it adopts both DW-K and IKs not as two conflicting knowledge waves but as two distinct epistemological systems that can exist side by side (Bartlett et al., 2012; Iwama et al., 2009). Importantly, it "avoid[s] knowledge domination and assimilation by recognizing the best from both worlds" (Hatcher, Bartlett, Marshall, & Marshall, 2009, n.p.). This methodology is often employed in research to examine how DW-K and IKs can be integrated into school curricula or programs (Hatcher et al., 2009).

In this research, the purpose was to highlight how IEK and ECCD can coexist, by analyzing a rural school's experience in integrating IEK into the curriculum and pedagogy of environmental studies topics. A two-eyed seeing methodology allowed me to examine how children and teachers can learn "to see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the strengths of Western ways of knowing and to using both of these eyes together" (Hatcher et al., 2009, p. 146). The application of two-eyed seeing also revealed how teachers taught ECCD curricula with the understanding that IEK and DW-K are equal.

Again, the two-eyed seeing methodology also served as a framework to guide practice by helping the teacher respect and acknowledge both worldviews as beneficial in the teaching processes (Iwama et al., 2009).

3.1.2 A case study methodology.

The study employed a qualitative case study approach to support the two-eyed seeing Indigenous approach in exploring how IKE could be integrated into the curriculum and pedagogy of ECCD in Boania Primary School of the Upper East Region. According to Zainal (2007), a case study methodology offers the researcher the chance to understand the phenomenon through the actor's own perspective. Yin (2003) stated that a case study methodology is considered when the focus of the study is to answer a 'how' or 'why' question. The case here represented the KG2 classroom from Boania Primary School. According to Baxter and Jack (2008), the case in this approach usually represents the units of analysis. Cassell and Symon (2004) observed that the case study approach is necessary for understanding a phenomenon that is not separate from context and the aim is to understand how behavior/ or process is influenced by and influences context. The phenomenon is explored through "a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood" (Baxter & Jack, 2008, n.p).

3.1.3 The connection between two-eyed seeing and case study methodologies.

The two methodologies try to understand phenomena from the perspective of the research participants. Zainal (2007) for instance concluded that a case study methodology offers the researcher the chance to understand the phenomenon through the actor's own perspective. Likewise, in the context of two-eyed seeing Indigenous methodology, it is recommended that phenomena be understood through the perspective of the researched. Based on this Sinclair (2003) opined that research must reflect both the owner of the knowledge and their meanings respectfully and accurately.

Another important feature linking the two methodologies is the belief that knowledge gathered is social, subjective, and context related (Cassell & Symon, 2004; Castellano, 2004; Yin, 2003). This emerges from the fact that the two methodologies analyze a phenomenon within its own context. Meaning creation is, therefore, context-related, thus making them fit succinctly well into the Indigenous research paradigm adopted. According to Tuck and McKenzie (2014), Indigenous epistemologies or knowledge frameworks are always people and place-specific. Similarly, Cassell and Symon (2004) observed that the case study approach is necessary for understanding a phenomenon that is not separate from context and the aim is to understand how behavior/ or process is influenced by and influences context.

3.2 Methods and research setting

3.2.1 Setting

The choice of a rural school was influenced by Masuku Van Damme and Neluvhalani's (2004) assertion that although Indigenous Knowledge (IK) is fast diminishing in Africa, remnants of it still exist in rural areas of the continent. The chosen district, Kasena-Nakana West District has about 79% rural population (Ghana Statistical Service, 2014), making it likely that IEK could still be robust. Research in rural communities has empirically demonstrated that IEK is still used in addressing current environmental challenges in Ghana (Adom, 2018; Boafo et al. 2016).

The study into the integration of IEK into ECEE took place in Boania Primary School of the Upper East Region of Ghana. The school is located in the village of Paga Buru Boania, a peasant farming community with about 109 houses (Ghana Statistical Service, 2014). The community has a total population of 1,331 people of which 646 are males and 685 are females (Ghana Statistical Service, 2014). It is located seven kilometers east of Paga, the Kasena-Nankana West District capital. Boania falls within the Sudan Savannah vegetation zone consisting of grasslands interspersed with short and drought-resistant trees such as the acacia, baobab, shea trees, and neem trees, among others (Awedoba, 2000). Climatically, the community is "characterized by six months of a single rainy season with a prolonged dry, cold, and hazy harmattan season" (Boafo, 2019, p.2).

According to a Boanian Elder, Awariwe, (male Elder, participant observation notes, February 11th, 2020), the school was established in 1963 when the then Convention Peoples Party (CPP) under the first president of Ghana, Kwame Nkrumah embarked on the policy of Accelerated Development. During this era, many schools were established under trees of which Boania Primary School was one. The school began with a total number of 23 students under a Tamarind tree until 1980 when the government of Ghana built a three-classroom cement block school at its present location. The school began the kindergarten system in 1981 by following the 1974 Dzobo Committee's recommendation that kindergartens be established in all basic schools in Ghana. Kindergarten was seen as a way of giving children an early start to education.

Boania consists of the Kasena ethnic group, a collection of people speaking Kasem, a language of the gurusi sub-branch (Awedoba, 2000). The ethnic group is geographically located in Northern Ghana and Burkina Faso. The IEK presented in this paper does not represent the IEK of all the Kasena ethnic group. Rather, the paper focuses on the IEK of the Kasena of Paga Buru Boania in Ghana.

3.2.2 Data collection.

Data were collected by using document analysis (adopted to provide context, historical background, and to validate observational and interview data), participant observation, and in-depth interviews. A total of 12 research participants were selected from the Boania Primary

School and community. This included: two Elders, one KG2 teacher, and nine (9) KG2 (age range of 6 to 8) pupils from the school. Research participants were selected purposively in this research. Hence a non-probability sampling technique was adopted (see Tongco, 2007), which is "a nonrandom technique that does not need underlying theories or a set number of participants" (Etikan, Musa, & Alkassim, 2016, p. 2).

Sharan (1988) stated that purposive sampling is based on the assumption that one wants to discover, understand, gain insight about a particular topic; therefore, one needs to select a sample from which one can learn the most. Thus, I selected a sample that best answered the research questions of the study. Huntington (2000) suggested that when conducting research involving TEK, it is best to select key informants rather than to select a random sample of the community. When researchers do not know the community, they should seek advice from the community council to select the most knowledgeable persons in TEK (Huntington, 2000). In this study, I selected two Elders from the chief of Boania's council of Elders based on recommendations from a community informant (assemblyman). Tongco (2007) stated that a researcher must also come up with criteria for selecting research participants. Based on the research focus of studying the integration of IEK in a two-eyed seeing approach into ECEE, I selected Elders who had undergone an Indigenous African educational system and still practice IEK. The teacher participant taught the KG2 classes at Boania Primary School. The criteria for selecting the 9 pupils out of the class was based on school attendance and participation in all outdoor learning activities with the two Elders.

First, I interviewed the two community Elders and the KG2 teacher on what they knew about IEK and how they thought it could be included in ECCD curriculum and pedagogy. After the interviews, I, two Elders, and the teacher met to discuss about the curriculum and what they would teach the kids. Second, this knowledge was incorporated into classroom topics (mostly environmental studies topics) in the KG2 curriculum. These topics included: living and non-living things (including animals, domestic and wild); water, air, plants, gardening (including types of soil and gardening, making the soil fertile for gardening); light - day and night (including natural and man-made sources of light); changing weather conditions (including

changing weather conditions, positive and negative effects of Weather conditions); and "my local community" (Ministry of Education, 2019). The incorporation of IEK was done with the help of the two Elders from January 2020 to March 2020. The Elders were invited to the school once a week until the end of the research period to teach the children IEK (through outdoor learning activities) based on the environmental studies topics in their curriculum. The topics listed above appear the same way in the Ghana Kindergarten curriculum (see Ministry of Education, 2019).

3.2.3 Data analysis.

A thematic analysis was adopted to analyze data. Thematic analysis is "a form of pattern recognition within the data, where emerging themes become the categories for analysis" (Fereday & Muir-Cochrane, 2006, p.82). According to Braun and Clarke (2006), it "is a method for identifying, analysing, and reporting patterns (themes) within data" (p.6). The research adopted a thematic analysis approach because it is flexible and can be modified. Thus, providing "a rich and detailed, yet complex account of data" (Braun & Clarke, 2006, p.5). The analysis process began with transcribing interviews, coding, and categorizing codes into themes. Themes were deductively selected based on how they helped answer the research questions of the study (Braun & Clarke, 2006). This was done by using NVivo 12 Plus, computer software that facilitated the coding of data and organizing it into themes. Identified themes were discussed with research participants to ensure the themes truly represented their views. Again, since interviews were in Kasem translation into the English language occurred concurrently with transcription.

Additionally, a description was adopted to analyze Participant Observation data which was also used to support the themes identified in the interview data. According to Flick (2014), descriptive analysis in observation involves describing events as they happened. That is to "write them down as you see them" (Flick, 2014, p.359). In this case, learning activities were described as shown in Table 4.1.

3.2.3.1 Transcription

Interview data consisted of audio recordings, typed transcripts of audio recordings, and the interviewer's notes. The notes were documented observations about the interview content, the participant, and the context (Mack et al., 2005). Audio recordings were self-transcribed by me because data analysis begins with transcription. Bailey (2008) for example, stated that the representation of audible and visible "data into written form is an interpretive process which is therefore, the first step in analyzing data" (p.127). In addition, I adopted verbatim transcription in line with the two-eyed seeing methodology. Bailey (2008, p. 130) argued that "decisions about transcribing are guided by the methodological assumptions underpinning a particular research project", as it informs the level of details from the data that will be needed for analysis. Because I sought to examine the experiences of research participants with the integration of IEK into ECE curriculum and pedagogy from the participants' own view, a verbatim type of transcription was more suitable for my study. Thomas (2005) for instance stated that an Indigenous method must create room for the research participant to tell their story on their own terms. Likewise, Sinclair (2003) concluded "One gathers the words, knowledge, and wisdom of others and has tremendous obligations to reflect both the owner of the knowledge and their meanings in a respectful and accurate way" (p. 128). Thus, direct quotations were adopted to present evidence of research participants' own views on the topic and bring them into the research (Creswell & Poth, 2018). I read the transcripts back to the participants to verify if what I had written really reflected their views. By this, the participants were given the opportunity to make changes they wanted to the transcripts to more accurately represent their views. Again, since interviews were in the local dialect (Kasem), transcribing was also a process of translating interviews from Kasem into English. Hence, the verification process offered me the opportunity to verify some terms from the research participants. Since I interviewed the teacher and Elders twice each transcription occurred immediately after each set of interviews. Also, during this process, I was able to identify some terms that were to be used later on for coding.

3.2.3.2 Coding

After I had transcribed the data ensuring they represented the participants' views, I coded by drawing on the computer software, NVivo12 Plus. Decisions on what words to code were guided by Saldana's (2016) suggestion on using coding filters by selecting words that spoke more to the subject matter of the research. I adopted solo coding since I was the only researcher (Saldana, 2016). Codes were organized under broader themes. These themes were deductively generated based on how well they helped answer the research questions of the study (Braun & Clarke, 2006). As a result, the generation of themes was based on the questions that the research participants answered and my analytic interest (Nowell, Norris, White, & Moules, 2017, p.8). Since the data involved three different categories of research participants (Elders, Teacher, and pupils), themes were organized according to research participants. Twelve research participants were interviewed, including two Elders, one KG2 teacher, and nine pupils from the KG2 classes. Codes were also organized into these three nodes (Elders, teachers, and pupils), and each of these contained transcripts from the research participants. This categorization was necessary to capture each participant's views on the research.

3.3 Insider-outsider relationship

The issue of the insider-outsider relationship deals with a researcher's relationship with the research participants. Since I come from the same village as the research participants, it is important to outline how I handled data collection and analysis to prevent bias. I adopted a dialectical approach (see Dwyer & Buckle, 2009), attempting to view the relationship not as an insider versus outsider, to handle this issue. I drew from the positives from both positions while being aware of the problems associated with the two positions also. For example, coming from the same community as the research participants, I had a deeper understanding of their experiences and hence was in a position to give an in-depth description of their IEKs. However, it is also true that since the IEK studied was entirely new to me, I was an outsider. I had not learned this degree of IEK when I was a youth in this community. Clearly, there were benefits and problems in coming from the same community as research participants and even knowing some personally before the research.

Being closer to an insider (see Dwyer & Buckle, 2009), I was easily accepted and had faster access to some of the research participants (Elders) in that there was an already existing relationship and trust that I would do no harm hence consent was easy to access. Again, I had a deeper knowledge of the cultural norms and protocols of the community making it easier to further build trust. I also had an in-depth and breadth understanding of the research population that may not have been accessible to a researcher who was closer to an outsider. Likewise, the research participants were much more comfortable sharing their experience in the research with me resulting in the gathering of a wide breadth of data.

But there was the danger of issues relating to objectivity, reflexivity, and authenticity of the research project (see Dwyer & Buckle, 2009). Coming from the same community, there was the danger of research participants assuming that I already knew some of their IEKs and thus, they may not have given detailed explanations of concepts.

Again, there was further danger of me not being able to separate my personal perspectives from those of the research participants. Resulting in clouded judgments "but being an outsider does not create immunity to the influence of personal perspective" (Dwyer & Buckle, 2009, p. 59).

3.3.1 Handling insider/outsider concerns.

First, I consider myself neither an insider nor an outsider. Dwyer and Buckle (2009) argued that "We may be closer to the insider position or closer to the outsider position, but because our perspective is shaped by our position as a researcher (which includes having read much literature on the research topic), we cannot fully occupy one or the other of those positions" (p. 60). Having exhaustively examined the literature on the integration of IEK into education in other contexts, I was drawn into thinking that I could find a single story (similar to the sky woman) that defined the Kasena ethnic group's relationship to nature. Likewise, the research proposal and research questions were originally designed along a similar line of finding out (from the Elders) how a single story that encapsulated the IEK of the Kasena can be used to integrate IEK into ECCD. However, there was no single story that encapsulated the IEK of the Kasena ethnic group. Unlike other Indigenous groups, the IEK of the Kasena was so diverse that

it would not fit into a single story. Hence, I had to adopt a different strategy by basing the teaching of IEK on environmental studies topics in the KG2 curriculum. This shows how the literature influenced my thinking. This confirms Dwyer and Buckle's (2009) argument that as researchers our perspectives are influenced by our training, hence we may either "be closer to the insider position or closer to the outsider position… but we cannot fully occupy one or the other of those positions" (p. 60).

Besides, the IEK gathered were things I did not know about. As a result, I had to involve the two-Elders in all research analysis, interpretation, and writing process to avoid misrepresentation and bias.

Dwyer and Buckle (2009) observed that "As a qualitative researcher I do not think being an insider makes me a better or worse researcher; it just makes me a different type of researcher" (p. 56). Being either an outsider or an insider have both their positives and negatives. However, "the core ingredient is not insider or outsider status but an ability to be open, authentic, honest, deeply interested in the experience of one's research participants, and committed to accurately and adequately representing their experience" (Dwyer & Buckle, 2009, p. 59). This was what I did by presenting the true words of the research participants as objectively as I could. This can be observed right from the prologue, considering the setting of the research (Canadian society), a pet-friendly society (see Hunter & Brisbin, 2016), writing that an ethnic group kills dogs as meals during marriage celebrations is surely not a proper way to endear Canadians towards that ethnic group. I could have chosen any other animal to make the writing more pleasant but presented the truth.

3.3.2 Personal subject location

In writing about the IEK of the community of Boania, I am highlighting the role local knowledge can play in decolonizing ECE whilst achieving environmental sustainability at the same time. By reclaiming local cultural knowledge and reconnecting with Ancestral teachings of the community of Boania I am showing a mutual co-existence with the Land and environment. Thus, validating and centering IKs in ECE. I believe the decolonization of schooling in Ghana and Africa is a journey of resistance (see Dei, 2015). As the scholar noted, decolonization is

about knowledge contestation and whose experiences count. Thereby this dissertation is my contribution towards this resistance to the continuous domination of ECE by DW-K. I am contributing to this journey by also introducing the concept of holistic (body, mind, and soul) and spiritual teachings into ECEE. In line with Dei (2015), I admit in writing about IKs we are taking a political stand of resistance, and sometimes the independence of scholarship and activism is a luxury we cannot afford. Based on the rate at which ECE programs under the DW-Ks are being promoted in Ghana and sub-Saharan Africa, scholars can no longer afford to write about the role IKs can play in ECE from afar but move into communities to show how to Indigenize ECE.

Again, through this research, I am answering the critical questions of what it means to reclaim local cultural knowledge and reconnect with Ancestral teachings? and What responsibilities do such teachings place on the contemporary African scholar/learner in the [Western] academy? Hence in writing about the IEK of the Kasena of Boania, I am taking on a responsibility as a researcher for the knowledge produced. As Dei (2013) observed, "when we conduct research we implicate our bodies in taking responsibility for the knowledge we produce" (p.31). Therefore, it is my responsibility not only to report this knowledge truly but also to live according to the teachings of mother earth of community, relationship, respect, responsibility, and reciprocity that this knowledge incorporates. These earthly teachings from the community of Boania are what I also bring into the Western academy. Emphasizing community instead of Individualism among learners (see Dei, 2015).

3.4 Limitations

There were other environmental studies topics that could not be taught due to covid-19 protocols. Perhaps other outcomes may have emerged to enrich the analysis.

Acharibasam, J.B. & McVittie, J. (Submitted, December 2020). Connecting children to nature through the integration of Indigenous Ecological Knowledge into Early Childhood Environmental Education.

Contributions: John Bosco Acharibasam [conceived of the presented idea, collected, and analyzed data/ prepared/designed/drafted and reviewed the paper].
Dr. Janet McVittie [encouraged, / supervised the findings of this work/ edited and made suggestions].
John Bosco Acharibasam wrote the paper from his research, but both authors discussed the results and contributed to the final manuscript.

CHAPTER FOUR - INTEGRATING KASENA'S INDIGENOUS ECOLOGICAL KNOWLEDGE INTO EARLY CHILDHOOD ENVIRONMENTAL EDUCATION IN BOANIA PRIMARY SCHOOL, GHANA.

4.0 Introduction

In the field of Environmental Education (EE), calls have been made to integrate Indigenous content into programs (see Agyeman, 2002; Fien, 1995; Marouli, 2002; Martusewicz, Edmundson, & Lupinacci, 2011; Nesterova, 2020; Sauvé, 1997; Taylor, 1996; Wilson, 1994; 1996). More importantly, evidence suggests that relying on DW-K alone to deliver EE is not the best approach to achieving sustainability, and those in the field of EE must find ways to incorporate Indigenous knowledge and cultures (Agyeman, 2002; Fien, 1995; Marouli, 2002; Martusewicz et al., 2011; Sauvé, 1997; Taylor, 1996; Wilson, 2001). Wilson (1994) for example concluded that EE involves much more than learning scientific facts about the natural environment. Based on this, Martusewicz et al. (2011) observed that EE only touches on the surface of problems because it does not examine cultural behaviors and belief structures.

Similarly, in the context of ECEE, scholars emphasize the need to include local culture and Indigenous content (see North American Association of Environmental Education [NAAEE], 2010; Ritchie, 2012). The argument in favour of this integration is that ECEE aims at developing in children love and respect towards nature/environment (NAAEE, 2010; Tilbury, 1994; Wilson, 1994). Another important goal is to support children in developing love and respect for knowledges indigenous to that place (IKs), but especially, Indigenous ecological knowledges (IEKs). Generally, IEKs have the cultural framework of love, respect, reciprocity, and responsibility towards nature (see Kimmerer, 1998; 2002; Reid, Teamey, & Dillon, 2002). Ritchie (2012) for instance observed that the inclusion of Indigenous perspectives in ECEE provides a valid counter-narrative to the DW techno-industrial emphasis that continues to damage our planet. Thus, IEKs are well suited to develop in children the love and respect towards nature which is an integral aim of EE.

Given that EE is taught as one of the themes (theme 6) under Ghana's ECCD curriculum, one may ask why it is necessary to examine the integration of Indigenous content into ECEE separately. Two reasons (which are derived from Meier & Sisk-Hilton, 2017) underpin this decision. First, ECEE deserves special attention because it is a new field of study and, second, it may not get prioritized since the ECCD curriculum covers many topics (see Abrompah, 2010). So far studies have shown that EE, in general, is not prioritized in Ghana's formal education system (see Ganaa, 2011). The unfortunate result is that the destruction of the environment due mainly to anthropogenic causes continues unabated (Adams, Adom, & Klobodu, 2016; Kessey, & Arko 2013). Therefore, situating the Indigenization of ECEE in the broader ECCD program will not give the program the attention needed. Integrating IEK into the ECCD program, as well as infusing it into theme 6 of the curriculum, could make a positive difference. The approach that seems appropriate is to use a two-eyed seeing methodology, such that both IEK and DW-K are addressed.

The purpose of this paper is to describe a research study that used a two-eyed seeing approach to teach both DW-K and IEK in ECEE in a village school in the Kasena-Nakana West District. The question driving the research was to determine in what ways Kasena's IEK would fit within the ECEE curriculum.

4.1 Early Childhood Environmental Education (ECEE)

Wilson (1994 as cited in NAAEE, 2010) defined the goals of EE in early childhood to be "the development of a sense of wonder; appreciation for the beauty and mystery of the natural world; opportunities to experience the joy of closeness to nature; and respect for other creatures" (p. 2). She further stated that ECEE also aims to foster "positive attitudes and values about the world of nature and a sense of responsibility toward the natural environment" (Wilson, 1994, p. 23). Similarly, the North American Association of Environmental Education (NAAEE, 2010), stated that ECEE is "a holistic concept that encompasses knowledge of the natural world as well as emotions, dispositions, and skills" (p. 2). The ultimate goals of ECEE are to develop personal perceptions of attitudes about, and connections with nature (NAAEE, 2010). That is, ECEE aims

at teaching children to learn how to love nature before asking them to save it (NAAEE, 2010; Sobel, 1996).

The benefits of introducing children from an earlier age to the environment or nature is a long-standing issue that has gained significant attention (see Boileau, 2013; Cutter-Mackenzie & Edwards, 2013; Louv, 2008; NAAEE, 2010; Wilson, 1994). Importantly, research in ECEE has empirically demonstrated the benefits that accrue to children when introduced to nature at an earlier age (Ärlemalm–Hagsér, 2013; Burdette & Whitaker, 2005; Taylor & Kuo, 2009; Sobel, 1996; Wells & Evans, 2014; Wilson, 1996; Zamani, 2016). For example, Wilson (1996) argued that interaction with the natural environment is vital for children to develop a positive regard for the environment and flourish as healthy individuals. Hartig, Mitchell, de Vries, and Frumkin (2014) showed how contact with nature enhanced health through "air quality, physical activity, social cohesion, and stress reduction" (p.207). Sobel (1996) suggested that if sustainability is to be achieved, children must be taught to love nature first before they are asked to save it. The idea behind this is that "early environmental experiences are vital in developing a relationship with the environment and developing environmental concern" (Barratt Hacking, Barratt, & Scott, 2007 as cited in Boileau, 2013, p. 142-143). This is particularly, important in recent times where Pyle (2003) has noted that people's sense of connection to nature "has paled, withered, and is finally failing" (p. 206). Hence "there is no longer any doubt that a strong individual sense of connection to nature and natural processes is utterly essential to the healthy coexistence of humans with their biological neighbours and physical setting" (Pyle, 2003, p. 206).

Similarly, in Ghana children are introduced to nature from an early age. The country recognizes that the population depends directly on the environment for survival (Ganaa, 2011). Hence Ghana's national environmental policy aims at achieving a balance between economic development and environmental sustainability (Ganaa, 2011; Ghana National Environmental Policy, 2012). As stated, nationally, Ghana has recognized that economic development cannot be achieved with the continuous degrading of the environment. The Ghana National Environmental Policy noted, "The conservation of resources by all Ghanaians is therefore crucial to our survival as a country" (p. 1). Further, the policy stated, "conservation and sustainable use

of these environmental resources and their protection depends on attitudinal and behavioral change by all individuals, households, private, and public sector institutions" (p. 1). Based on this, the Ghana National Environmental Policy (2012) sees EE as the best approach to achieving more environmentally sustainable behavioral change.

Specifically, the National Environmental policy strategic goal 5 aims at promoting environmental awareness, empowerment, and concern for the environment. As stated, the "Government will promote the education and empowerment of all Ghanaians by increasing their awareness of, and concern for environmental issues" (Ghana National Environmental Policy, 2012, p. 17). To achieve this, the following steps are proposed:

- the integration and expansion of environmental education in the curricula of all levels of the educational system
- the integration of environmental education into all non-formal educational programmes
- the enhancement of environmental literacy through the media and the assurance that environmental education programmes and projects promote a clear understanding of the inter-relationships between and among economic social, cultural, political, and environmental issues
- the provision of all environmental policy documents in the major Ghanaian languages

Based on the first step, EE has been added to the ECCD curriculum in Ghana as a learning area alongside traditional areas such as numeracy and literacy (see Ministry of Education, 2006, 2019). Thematic Unit 6 of the new Kindergarten curriculum (All Around Us) deals with EE topics (Ministry of Education, 2019). Specifically, the following topics are taught: living and non-living things (living things: animals, domestic and wild), Water, Air, Plants, Gardening (types of soil and gardening, making the soil fertile for gardening), Light - Day and Night (natural and man-made sources of light), and Changing weather conditions (Changing weather conditions, Positive and negative effects of Weather conditions). The aim is to develop in children "the spirit of curiosity, creativity, innovation and critical thinking for understanding and developing themselves, their local and global environment" (Ministry of Education, 2019, p.

vi). The idea behind this is that ECEE will inculcate in children "a strong sense of environmental, social, and economic awareness, with emphasis on protecting the environment" (Ministry of Education, 2019, p. vii).

Despite the benefits that Ghana stands to gain from IEKs, the EE program (under which ECEE falls) has been introduced as an integrated program focusing on both environment and science to the neglect of IKs, particularly IEKs. According to the Global Environmental Education Partnership (2019), there is no stand-alone EE legislation in Ghana. As a result of this, the Ministry of Education through the Ghana Education Service (the agency in charge of education) incorporates EE into formal education through the Integrated Science curriculum for all levels of education (Global Environmental Education Partnership, 2019). That is, EE is integrated into science from basic school to Senior High School. But the adoption of integrated science as an approach to integrating EE into classroom topics has resulted in too much focus on DW science to the neglect of IKs, particularly, IEKs.

Meanwhile, evidence suggests that relying on DW science alone to deliver EE is not the best approach to achieving sustainability, and EE must find ways to incorporate Indigenous knowledges and cultures (Agyeman, 2002; Fien, 1995; Marouli, 2002; Martusewicz et al., 2011; Sauvé, 1997; Taylor, 1996; Wilson, 2001). IKs emphasize "respectful interdependence with nature" (Ritchie, 2012, p. 63). For example, IEKs have the cultural framework of love, respect, reciprocity, and responsibility towards nature, and could easily be tapped into to achieve sustainability in the country. Besides when employed in ECEE, the teaching of IEK is less structured and gives children the freedom to explore nature at their own pace. Hence, IEK, taught in context, will fit into the goals of ECEE. As the NAAEE (2010) noted "The approach to environmental education for early childhood learners is less about organization of graduated achievements and more about free discovery on each child's own terms" (p. 3). One would think the Ghana Education Service would have anchored ECEE on the wide range of IKs that exist in Ghana. This could have been done by employing approaches (such as two-eyed seeing or Land-based learning principles) that allow for the invitation of Elders into classrooms to teach children IKs. The purpose of this paper is to assess some of the lessons that emerged from the integration

of IEK into ECEE in the Kasena-Nakana West District. The paper emerges out of doctoral research and received ethical approval from the University of Saskatchewan ethics office and the Ghana Education Service.

4.2 The study

As shown in chapter 3, this was a qualitative study that adopted multiple methods of participant observation and in-depth interviews to collect data. The integration of IEK into ECEE took place in Boania Primary School of the Upper East Region of Ghana. The school is located in the village of Paga Buru Boania, a peasant farming community. A total of 12 research participants took part in the study. These participants were observed in instructional situations and were interviewed. The participants included: two Elders from the community, one KG2 teacher, and nine pupils (KG2, ages 6-8 years) from the school.

First, I interviewed the two community Elders and the KG2 teacher on what they knew about IEKs and how they thought it could be included in ECCD curriculum and pedagogy. Second, a plan was developed to incorporate this knowledge into classroom topics (mostly environmental studies topics) in the KG2 curriculum. These topics included: living and non-living things (including animals, domestic and wild); water, air, plants, gardening (including types of soil and gardening, making the soil fertile for gardening); light - day and night (including natural and artificial sources of light); changing weather conditions (including changing weather conditions, positive and negative effects of weather conditions); and "my local community" (Ministry of Education, 2019). This was done with the help of the two Elders from January 2020 to March 2020. The Elders were invited to the school once a week until the end of the research period to teach the children IEKs (through outdoor learning activities) based on the environmental studies topics in their curriculum. The researcher observed in the classroom on the days the teacher taught the topics and observed when the Elders taught the topics. Observation notes became part of the data. The sections below present the results from the participant observation data and the in-depth interviews.

4.3 Summary of Results

4.3.1 Participant Observational Data.

This section presents observations of learning activities with the teacher in the classroom and the Elders on the Land. The themes that emerged from these data are presented as lessons for ECEE in Boania Primary school. I met to discuss the topics with the Elders days before each visit. But the Elders taught the concepts and topics their way. The two Elders alternated their visits; if the male Elder visited this week, the female Elder visited the next week, to teach IEK and take the children outdoors. This involved taking the children out into the Land /farm on outdoor activities. I was present on all these visits and outdoor activities to observe events and to take pictures. The teacher on the other hand taught these topics as they appeared in the curriculum, and, almost always, taught in the classroom. The reason why these Elders were invited was to create an avenue for the Indigenous knowledge holders to teach children directly. Kim and Dionne (2014) suggested that it is essential to create a venue for true experts to share their knowledge directly with learners.

The teacher taught curricular science content (environmental science subjects) once a week. This was either a day or hours before the Elders' visit to the school and this took place in the classroom. I was also involved in the research group (helping the teacher with the two-eyed seeing approach and meeting Elders to discuss teaching topics with them). This meant the research participants were aware of the study and its purposes (Kawulich, 2012). On each of these field activities (once a week) and during class lessons, I filled out the participant observation forms. This allowed me to capture more information that would have otherwise not been captured. Some of the outdoor learning activities are presented below.

Table 4.1 Outdoor and in-class learning activities with the teacher and Elders

Female Elder	Male Elder	Teacher
February 2nd, 2020 to February 8th, 2020	*February 9th to February 15th, 2020*	*February 9th to February 15th, 2020*
Trees and the roles they play in the Kasena woman's life in	The Land and the history of Boania Primary School. The	The teacher and her pupils examined the dichotomy

the community of Boania. Children went outdoors and identified different species of trees and their uses. They learned about the processing of shea butter, dawadawa, mortar, pestle, fuelwood, and fruits (under the topic of living and non-living things).	Elder stated that Land is very important to the Kasenas of Boania because it is through the Land that the Kasena communicate with their ancestors. The Land is the umbilical cord holding one to the ancestors he emphasized. That is why no ceremony or activity can begin without pouring a libation. Next, he traced the history of the school from under the tree where it first started to its present-day location. Identifying different farms and the plants that were grown on them during the rainy season after harvest (under the topic of living and non-living things).	between living and non-living things. The teacher brought along to the class posters /pictures of living (different plants, grass, and animals) and non-living things (stones, bags, spoon, table, and buildings). The children were taught the characteristics of living things vis-a-vis non-living things. Teaching was in class. The children were graded on their performances (drawings) and all this teaching took place in the class. Teaching was more structured, and children raised hands before they answered questions. Due to the small nature of the classroom and limited learning materials (such as slates, pencil sharpener, books, coloured pens, dusters), there was fighting during lessons in the classroom and arguments would erupt. In class, fighting became more pronounced during environmental studies where there were more drawing and a greater need to share learning materials.
February 16th to February 22nd , 2020	*February 23rd to February 29th ,2020*	*February 23rd to February 29th,2020*
Identifying trees used for fuelwood and those forbidden to burn (taboos). Some trees are forbidden due to respect for particular species. This even extends to certain species	Identifying trees in the community, their traditional names, and uses. Besides the tangible uses of trees, he also taught about intangible things trees gave like learning from	History of Boania, community, taboos, beliefs, and worship as well as responsibilities of the chief. On the 25th of February 2020, the class KG2 [together with

of animals too. Among the Kasena, each household or even family has a personal deity they worship. Part of this worship normally involves reverence for a certain animal or plant species. Hence, it is forbidden to either kill or burn such trees for fuelwood. Next, they identified elephant grass and straws used in making traditional mats, bags, and baskets. The planting of the kenaf plant [Hibiscus cannabinus] and processing it into bast fibre. For making items such as ropes, mats, baskets, baskets, and bags (under the topic of living and non-living things).	them to live sustainably. He stated that some trees are regarded as family. The boabab and tamarind trees for example are often regarded as a family because they live longer. To know the history of the community is to look to the baobab or tamarind tree the Elder concluded. These trees have seen generations come and go including their ancestors. As a result, these trees know their ancestors personally, their names, and their faces. Hence they cannot be treated as just trees but rather as part of the family and community. He also taught the children how Kenaf [Hibiscus cannabinus] was processed into bast fibre by soaking the freshly cut kenaf stems under muddy water for seven days. After which the bast fibre is peeled off from the Kenaf stems and washed. There is a gender dimension to this plant. Among the Kasena, the Kenaf is only grown by women, but both men and women are allowed to process the plant into bast fibre (under the topic of living and non-living things).	KG1] visited the chief's palace. The two classes treated knowing important places (church, mosque, police station, fire service) and people (priest, imam, chief, pastor) in my community (under the topic my local community).
March 1st to March 7th , 2020	*March 8th to March 14th , 2020*	*March 8th to March 14th, 2020*
Traditional sources of good drinking water before the coming of the borehole to Boania. Visiting the river, Daa	Harvesting termites for chickens and the role of the chicken in Kasena ceremonies (under the topic of living and	The teacher taught on sources of water and its uses. A class activity followed by which the children were asked by their

buga (under the topic of water)	non-living things). Unfortunately, he could not teach about water because the research stopped due to COVID 19.	teacher to draw and form sentences on the sources and uses of water. One of the goals was to have children use some keywords (relating to water) to make simple sentences. Teaching was in class.
Topics below could not be treated because the study ended due to COVID 19 controls in place	*Topics below could not be treated because the study ended due to COVID 19 controls in place*	*Topics below could not be treated because the study ended due to COVID 19 controls in place*
Air	Air	Air
Gardening (types of soil and gardening, making the soil fertile for gardening),	Gardening (types of soil and gardening, making the soil fertile for gardening),	Gardening (types of soil and gardening, making the soil fertile for gardening),
Light-Day and Night [natural and man-made sources of light	Light-Day and Night [natural and man-made sources of light	Light-Day and Night [natural and man–made sources of light
Changing weather conditions [Changing weather conditions, Positive and negative effects of Weather conditions]	Changing weather conditions [Changing weather conditions, Positive and negative effects of Weather conditions]	Changing weather conditions [Changing weather conditions, Positive and negative effects of Weather conditions]

Environmental studies topics were used to integrate IEK into ECEE and all teachings under the Elders occurred outdoors on the Land. As Kimmerer (2012) concluded, “the classroom is not the most conducive environment for engaging TEK in environmental science” (p. 320). Besides the day on which the class visited the chief’s palace, all teaching under the teacher occurred in the classroom. In fact, the teacher was doubtful the study would be possible because it occurred in the dry season with no green vegetation.

4.3.2 Interviews with thematic analysis.

A thematic analysis was adopted to analyze the interview data. This was “a form

of pattern recognition within the data, where emerging themes become the categories for analysis" (Fereday & Muir-Cochrane, 2006, p.82). The analysis of the interviews began with transcribing interviews, coding, and categorizing codes into broader themes based on the research participants (teacher, Elder, or pupil). This was done by using NVivo 12 plus computer software that facilitated coding of data and organizing it into themes.

4.3.2 .1 Transcription.

Interview data consisted of audio recordings, typed transcripts of audio recordings, and the interviewer's notes. The notes were documented observations about the interview content, the participant, and the context (Mack et al., 2005). Audio recordings were verbatim transcribed by me, in line with the two-eyed seeing methodology. Bailey (2008, p. 130) argued that "decisions about transcribing are guided by the methodological assumptions underpinning a particular research project", as it informs the level of details from the data that will be needed for analysis. I wanted to examine the experiences of research participants with the integration of IEK into ECEE curriculum and pedagogy from the participants' own view, thus making a verbatim type of transcription more suitable for the study.

Direct quotations were adopted to present evidence of research participants' own views on the topic and bring them into the research (Creswell & Poth, 2018). Scholars (see Sinclair, 2003; Thomas, 2005) argued in the context of Indigenous research that knowledge and meanings must be respectful and accurately reported. Transcripts were sent back (read back) to participants to verify if they reflected their views. This also allowed me to verify some terms from the research participants because transcribing was also a process of translating interviews from Kasem into English.

4.3.2.2 Coding.

After research participants verified the transcribed data, coding followed by drawing on the computer software, NVivo12 Plus. Decisions on what words to code were guided by Saldana's (2016) suggestion on using coding filters by selecting words that spoke more to the subject matter of the research. The research adopted solo coding since I was alone (Saldana,

2016). Codes were organized under broader themes that emerged from both the participant observation data and the interview data. Themes were organized, according to research participants (Elders, Teacher, and pupils). Twelve research participants were interviewed, including two Elders, one KG2 teacher, and nine pupils from the KG2 classes. Codes were also organized into these three nodes (Elders, teachers, and pupils), and each of these contained transcripts from the research participants. This categorization was necessary to capture each participant's views on the research. Below are some of the themes I identified in the research.

Table 4.2 Themes that emerged from both Participant Observation data and In-depth interviews data

Elders	Teacher
IEK is holistic and domains of knowledge are not divided	Domains of knowledge are divided into different subjects
Teaching is interdisciplinary	Teaching is not interdisciplinary
Pedagogy is casual and less structured	Pedagogy is less casual and structured
Learning outcomes are social	Learning outcomes are individual
Teaching IEK is experiential and happens outdoors	Teaching can be abstract and occurs either indoors or outdoors
Learning is context-related	Learning is not context-related
The role of peers is important	The role of peers is not clear
Outdoors reduces conflict	The rate of conflict was high indoors
Ontology is relational	Ontology is not relational

An examination of both sets of data (participant observation data and interview data) showed different themes. An example was that, unlike ECEE curriculum, IEK is holistic. Forms of knowledge are not divided into different subjects. Hence in the teaching of IEK, I observed the Elders employed different forms of knowledges including religion and spirituality to explain environmental concepts. This was not the case in the teacher's teaching of environmental concepts. Further explanations are given to these themes in the discussion chapter below.

4.4 Discussion

4.4.1 Pedagogical demands associated with IEK on the Curriculum and Pedagogy of ECEE.

One lesson learned from the study was that unlike the ECCD curriculum used by the teacher, domains of knowledge are not divided under IEK. Whilst teaching on living and non-living things, the Elders integrated several subjects to explain concepts. They talked about family, taboos, the spiritual dimensions of Land and trees, the pouring of libation, the connection to ancestors, among others. This demonstrates that environmental knowledge is not separate from religious and spiritual knowledge. Darko (2014) concluded "one cannot discuss Indigenous knowledge without mentioning Indigenous spirituality" (p. 186). Similarly, Kimmerer (2002), for the context of North America, concluded that IEK "is inseparable from the social and spiritual context of the culture" (p. 434). Maurial (1999) went further to state, in the context of Peru, that Indigenous culture actually views nature as being alive and "living nature possess different kind of spirits" (p. 65). The teacher on the other hand did not employ religion and spirituality in teaching living and non-living things. Rather, religion exists as a separate subject in the ECCD curriculum. This confirms previous studies by Nsamenang (2005) that under the traditional African educational system, domains of knowledge are not divided into different disciplines but knowledges about all aspects of life are integrated into one curriculum. These divisions affect how children see environmental knowledge and nature. Children see environmental knowledge as something to be gained rather than to be lived and the environment is something that is separate from them. Hence, if ECEE programs in Ghana are to successfully incorporate Indigenous content, they must consider the holistic nature of Indigenous knowledges.

Furthermore, curriculum outcomes were different between the two teachings. The Elders' teachings involved a "holistic engagement of multiple elements of human capacity: mind, body, emotion, and spirit, not just the intellect which is exclusively privileged in conventional environmental science education" (Kimmerer, 2012, n.p). I observed that within the teacher's classroom-based teaching the children were more concerned about their grades than within the outdoor learning activities with the Elders. In fact, the teacher employed this tactic to call children to order anytime she thought they were playing and not paying attention to the Elders

teach. She threatened to ask them questions based on the things the Elders taught in class. The two Elders were less concerned with grades. Consistent with this, Omolewa (2007) argued that the objective of Indigenous education in Africa is to make the individual complete and respectful to all creation (in other words, not about grades).

Also, in terms of pedagogy, the Elders' teachings were more casual, practical, less structured, and gave children the freedom to explore nature at their own pace. This fits with the NAAEE's (2010) recommendation that "The approach to environmental education for early childhood learners is less about organization of graduated achievements and more about free discovery on each child's own terms" (p. 3). The children did not raise hands before answering questions, and had opportunities with the Elders to play, and climb trees.

4.4.2 IEK helped take ECEE outdoors.

Similar to the above point, the integration of IEK into ECEE helped take environmental studies outdoors. With the inclusion of IEK, the Land became the teacher. Before the research, the class did not embark on many outdoor learning activities. When asked how often they undertook outdoor learning activities before the research, all 9 pupils said they had been on a few outdoor learning activities. The teacher confirmed they had not had many outdoor learning activities. She explained that the process a teacher has to go through before taking children outdoors was too cumbersome. She was also concerned about safety, with class size as a factor. As a result of these, most environmental studies lessons were limited to children sitting in the classroom, drawing trees and animals, and being graded. This finding is consistent with prior research in Ghana where Elvstam and Fleischer (2018) found out that outdoor learning pedagogy is not widely used.

Meanwhile, the NAAEE (2010) argued that, for ECEE to be effective, there was a need for frequent contact with the natural environments. The outdoor environment with its natural unrestricted spaces offers children space to move and play and to develop different kinds of skills (Bilton, 2002, as cited in Yilmaz, 2016, p.424). As the NAAEE (2010) concluded in the case of ECEE, "environmental education should incorporate exploring woodlands, getting wet feet, climbing rocks, building with sticks, running on grass, turning over rocks, following insects,

stomping in puddles, and so forth" (p. 3). Hence, the integration of IEK into ECEE in Boania Primary School helped take EE outside the classroom to give children a more hands-on learning experience. To suit IEK, learning had to be practical and outdoors. Kimmerer (2012) concluded "teaching the specifics of TEK does not necessarily belong in the classroom" (p. 319), because the source of IEK is the Land and its inhabitants and not the curriculum. This was evident in the responses from the pupils regarding their experience in learning IEK with the Elders. The children responded that it gave them the chance to: play, learn the names and uses of trees and grasses, climb trees, eat fruits, dig for water, and make mats, bags, and baskets. All these were practical things and the children added that they were not graded. As Boileau (2013) concluded, "children are most interested in doing, experiencing, playing, and moving around" (p. 149-150).

4.4.3 IEK helped connect children to their environment.

Closely related to the above point is that the integration of IEK into ECEE also helped connect children more to nature through the adoption of more experiential and outdoor approaches to suit IEK. According to NAAEE (2010), "The task of environmental education for young children is to forge the bond between children and nature" (p. 4). Similarly, Bhagwanji (2011) observed that the importance of ECEE is not to develop children's knowledge of the natural world alone but to also foster emotional connections to nature. According to the scholar, "they are given the opportunity to develop a sense of wonder and an appreciation for the beauty and mystery of the natural world" (p. 4). The importance of outdoor learning in connecting children to nature has also been emphasized by other scholars (see Ärlemalm–Hagsér, 2013; Burdette & Whitaker, 2005; Gelman & Brenneman, 2004; Sobel, 1996; Wells & Evans, 2014; Wallin, 2017; Wilson, 1996; Zamani, 2016). One of the major objectives of ECEE is to increase children's contact with nature. Based on this, Wilson (1996 as cited in Poppell & Monroe, 2017) argued "It is critical for young children to interact with their natural environment both to develop a positive regard for the environment and to flourish as healthy individuals" (n.p). Similarly, Hacking, Barratt, and Scott (2007, as cited in Boileau, 2013) stated "early environmental experiences are vital in developing a relationship with the environment and developing environmental concern" (p. 142-143).

However, it would be wrong to assume that the lack of regular outdoor learning activities in Boania Primary School means children in the community are not in regular contact with nature. Being a rural community, most of the children play outdoors after school, with most homes not having electricity, televisions, and video games. Hence children are in constant contact with nature all the time. The Nature Deficit Disorder hypothesis (see Louv, 2008) may not be applicable in the rural context. But as to whether they are learning about the environment or not in the context of the home environment is not clear. That is, this study has not addressed the question of whether exposure to nature after school helps develop the relationship, respect, and a sense of responsibility towards the environment.

4.4.4 Outdoor Learning helped in behavior control.

I observed fewer conflicts between children when they were outdoors for their learning. During classroom-based lessons, due to the small nature of the classroom and limited learning materials (such as slates, pencil sharpener, books, coloured pens, dusters), children were often seen fighting, where one child would snatch a learning material from another, and arguments would erupt. In class fighting became more pronounced during environmental studies where there were more drawing and a greater need to share learning materials. Sometimes, the fighting forced the teacher to employ corporal punishment to maintain order in the class. However, by taking ECEE outdoors, most of these behaviours were mitigated. Scholars have argued that outdoor education makes learning environments democratic, stress-free, and a more interactive process among students and teachers (Berman & Davis-Berman, 2000). There was enough room for everybody and learning materials (provided by the environment) were not limited. Hence, I observed no fighting among the pupils. There was no single time any of the Elders employed corporal punishment to keep pupils in line.

4.4.5 IEK connected learning to children's realities and their home environment.

According to the NAAEE (2010),

> Environmental education often begins close to home, encouraging learners to understand and forge connections with their immediate surroundings. The environmental awareness, knowledge, and skills needed for this localized learning provide a foundation for moving

> out into larger systems, broader issues, and a more sophisticated comprehension of causes, connections, and consequences (p. 6).

Taylor (1996) also concluded that "learning occurs when students make connections between what is taught in the classroom and what happens in their daily lives outside of school" (p. 3).

As observed by scholars, many students do not abandon their IKs when they start DW schools, but they try to make connections between DW-K and IK (Fakudze, 2004; Fakudze, & Rollnick, 2008; Jegede, 1995; Ogunniyi, 1995). As a result, efforts have been made to connect what is taught in schools to children's home environments. The ECCD curriculum in Ghana urges teachers to identify informal experiences children start school with and to expand on them (Ministry of Education, 2006). Further to this, mother tongue has been adopted as the language of instruction in ECCD. Commenting on this Abdulai (2016) stated that to link the school to the child's immediate environment, Ghana Education Service made it mandatory for instruction in ECCD to be realized through a combination of English language and the existing local dialect where the school is situated. I observed that the integration of IEK into ECEE supported the children's learning in meeting environmental realities because knowledge taught was context-related or place-based (see Kim, Asghar & Jordan, 2017). Similarly, Kimmerer (2012) noted that in the teaching of IEK the "Land and its inhabitants are recognized as primary knowledge sources" (p. 319). I also observed that most of the things the Elders taught were things the children saw daily, and the children connected to them. The children already knew things like the processing of shea butter, making the learning connections fairly easy. This might have been why there was more participation in outdoor learning activities even from students who did not participate much in class. I observed that children who normally did not speak or answer questions in class were more engaged during the outdoor learning activities with the Elders. Perhaps the students were more engaged because they were already familiar with the content. But it might also be because they saw that this learning was more relevant to their lives or the outdoors was more stimulating.

4.4.6 Informal IEK is often learned from peers.

Children often learned about nature more from their peers and outside the school environment than from the teacher or parents. When asked how children learnt about the type of fruits to eat when outdoors, many of the children responded that they learned about them from their peers and older siblings. Again, some said they learned about these fruits whilst they tagged along with their older siblings as they took the animals (cattle or sheep) to graze. The children also said they could climb trees (such as a mango tree or guava tree), a skill they learned from their peers and siblings and not from parents or teachers. Some of the girls responded that their mothers would punish them if they ever caught them climbing trees because girls do not climb trees. Culturally, the community of Boania frowns on females climbing trees. For ECEE to succeed, it must incorporate peer-to-peer learning.

4.4.7 Ontological and epistemological differences between IEK and ECEE.

The integration of IEK into ECEE allowed children to have a different view of nature. The Indigenous ontology and epistemology on which the two Elders drew from to teach environmental topics were different from the teacher's use of the curriculum. Under the teachings of the Elders, the community had a strong relationship with nature, and they saw nature through this relationship (see Wilson, 2001; 2008). As Wilson (2001) noted, it is the relationship Indigenous people have with objects or ideas that is important. This relationship comprises "family members and non-family members as well as to the surrounding trees, Land, rivers, stones, air, rain, sunlight, skies, animals, ancestors, and the supernatural" (Darko, 2014, p. 190). Kasena's IEK is built through a similar relationship with nature. Children were therefore exposed to an Indigenous worldview which may ultimately foster their relationship with nature. France (1997 as cited in Hart, 2010, p. 1) argued "our worldviews affect our belief systems, decision making, assumptions, and modes of problem solving". The Elders' teaching provided a more informative understanding of the environment than the ECEE curriculum which focused on cognitive development of DW science concepts.

From the Elder's teachings, ontologically, there was no clear separation between the people of Boania and nature. Therefore, everything is related and is family. As Darko (2014)

argued, “the environment, therefore, exists in the complexities of the social, political, economic, religious, and spiritual relations within the community” (p. 190). Similarly, Marshall et al. (2010) commented in the context of Canada that “from an Indigenous perspective, humans are inseparable from the rest of creation” (p. 174). This was also found in the community’s relationship with the sacred trees, and other forms of creations. Harming an animal or a tree considered sacred means harming the whole village. There is a belief that harming sacred beings will bring curses on the entire village. By contextualizing teachings and highlighting how close the community’s relationship to nature is, the Elder’s teaching “reshapes abstract understandings of nature and Land” (Seawright, 2014, p. 570).

In discussing the features of an Indigenous worldview, Simpson (2000) noted that the Land is sacred and the relationship between people and the spiritual world is important. Hart (2010) also argued “if the spiritual and sacred elements are surrendered, then there is little left of our philosophies that will make any sense” (p. 6). Spirituality “constitutes an integral part of any effective ecological or environmental knowledge process in Africa” (Darko, 2014, p. 186). There is no separation between the spiritual and physical (see Datta, 2015). Everything to the Kasena is spiritual. In line with this Darko (2014) argued that to Indigenous Africans a “tree is not just a tree, a river is not just a river, and an animal is not just an animal; they are the physical manifestations of gods and spirit” (p. 186). The scholar went further to conclude that it is these “African traditional ontologies and axiologies that guided relationships between the individual, society, and nature” (p.190). Holistic teachings such as these connect children more to nature as they make them aware of our interconnectedness with nature.

Also, evident in the Elder’s teaching of living and non-living things was that being able to breathe, grow, reproduce, and respond were not the only characteristics for classifying things as living and non-living. The male Elder, for example, also talked about the relationship that one has with things, by stating that a tree was more than just a tree. According to him, the relationship the people have with some trees like the boabab and tamarind is sometimes equal to a family member. Teaching children to view trees as family members and to behave sustainably

towards them is completely different from what the ECEE curriculum has on trees (see Ministry of Education, 2019). Perhaps teachings such as these connect children more to nature.

Again, the Elder emphasized the point that trees are caring and gave things (such as fruits, leaves, and herbs) freely to the community. For that, the community must in return care for the trees; this had great resonance with the children because some of the children had either eaten or been treated with herbs from trees. This way of seeing nature is not present in the ECEE curriculum either (see Ministry of Education, 2019). Hence the children would not see trees as just ordinary trees after the teaching of IEK from the Elder.

The Canadian anthropologist, Wade Davis in a TED talk argued that our belief system determines how we relate to nature and our culture determines the environmental footprint we leave behind. According to Davis (2003),

> a young kid from the Andes who is raised to believe that the mountain is an Apu spirit that will direct his or her destiny, will be a profoundly different human being and have a different relationship to that resource or that place than a young kid from Montana raised to believe that a mountain is a pile of rock ready to be mined (10:10).

Based on this analogy, by teaching children to view trees as family members in Boania, they may grow to have a profoundly different relationship with trees than what is currently contained on trees in ECEE curriculum.

In terms of conservation, the Elders emphasized that as humans we must live in such a way that we do not harm other forms of creation. According to the Kasena, the earth 'Katiga' must be treated gently. Based on this the Male Elder talked about the traditional practice of creating corridors between farms to prevent habitat fragmentation; and to allow both wildlife and farm animals to move freely.

He also talked about humans learning from other forms of creation on how to live. From the jackalberry tree which grows on termite mounds, he taught the children the concept of live-and-let-live. According to the Elder, there exists a symbiotic relationship between the jackalberry tree and the termites, neither harming the other. The roots of the tree provide a habitat for the termites and they, in turn, do not eat the roots. He says humans can emulate this to live with nature.

Furthermore, from the *Faidherbia albida* tree the Elder indicated that humans must learn to use resources sustainably during bumper harvest. *Faidherbia albida* has a reversed or inverted phenology, in that "the species has the unique characteristic of shedding its foliage at the start of the rainy season, and of coming into leaf in the dry season" (Wood, 1992, p. 9). According to the Elder, the tree saves its water during the rainy seasons where there is plenty and uses it during the dry season where there is a shortage. Based on this, the Elder stated that humans should also learn to save food when there is a bumper harvest in the rainy season to cater to food shortages during the dry season. Since agriculture is rain-fed in the community, symbolically, dry season indicates lean season (food shortage) in the community of Boania, whilst rainy season indicates a time of bumper harvest because that is when farming is done.

However, botanists (see Wood, 1992) rather see the reverse phenology of this tree species as making it ideal for agroforestry since it does not interfere with agriculture. As Wood (1992) noted, "This unexpected inverted phenology means that its presence in farmers' fields does not interfere with agriculture, and, indeed, makes it an ideal agroforestry tree for use in combination with crops" (p. 9). These teachings confirm research by others that IEK has a cultural framework of respect, reciprocity, and responsibility towards nature (see Kim, Asghar, & Jordan, 2017; Maurial,1999; Parrota & Trosper, 2012; Reid et al., 2002), whereas DW science presents nature as a resource for humans. Hence Maurial (1999) concluded that DW-K "isolates human beings from nature" (n.p).

4.4.8 IEK changed the teacher's perception of ECEE.

During the recruitment process, the teacher doubted if the research would be possible since it would involve outdoor learning in the environment. According to her, the dry season presented a challenge because there was no green vegetation. There are two seasons in Ghana, the rainy season when everything becomes green and the dry season with no rains when most vegetation dries up and deciduous trees shed their leaves. The teacher's concern gave a glimpse into her understanding of EE. However, one reason accounting for this line of thinking could also be attributed to how environmental studies topics are organized in the new KG2 curriculum,

where all the environmental studies topics in the KG2 curriculum have been moved to what is the rainy season in Boania (see Ministry of Education, 2019).

Whatever the reason may be, the teacher's concern ties into the broader question of what constitutes nature to children. Louv (2008) concluded "for children, nature comes in many forms" (p. 7). Based on this, nature does not refer to only vast Lands of green cover alone. Even a bug in the classroom can become an EE topic to explore in the classroom as I observed during this research. While the class was cleaning out spider webs from the classroom, a spider fell from the ceiling and became a topic of discussion for the class. The children began asking questions about the spider such as its name in English, how many legs it had, what it fed on, and how it reproduced. The spider became a topic for that day and the teacher had to google the spider on her mobile phone to respond to these questions since the school has no library. During my last interview with the KG2 teacher on her experience, she opined that "one important lesson I have learned from the research was that anything can become a topic for environmental education in early learning and one does not need vast green vegetation to learn about nature" (Teacher, interview transcript, March 19th, 2020). The integration of IEK into ECEE has given her a different perspective and a deeper understanding of EE. This had occurred in a teacher-centered context, and so also had pedagogical implications because the children were inspired to drive their own inquiries.

Another implication emerging from her concern is what EE at the early childhood level aims to achieve. At the early childhood level, according to Wilson (1996), the goal of EE is to inspire in children a curiosity to explore nature and the aim is to lead to love and respect for nature in children by letting them interact regularly with nature. Importantly, research has shown that constant interaction with nature is one way of instilling love and respect for nature in children (Ärlemalm–Hagsér, 2013; Burdette & Whitaker, 2005; Sobel, 1996; Wells & Evans, 2014; Wilson, 1996; Zamani, 2016). Hence ECEE aims to inspire in children love for all of nature and not only green vegetation.

Besides, being heavily reliant on the concept of sustainable development there are broader aims for ECEE in Ghana (Ghana National Environmental Policy, 2012). Tilbury (1995)

stated “mounting concern over environment and development problems has meant greater support for an educational approach which not only considers immediate environmental improvement as an actual goal but which also addresses educating for sustainability in the long term” (p. 195). Likewise, in Ghana, the main goal of EE is not to achieve immediate environmental improvement alone but also aims at educating children towards the achievement of sustainable development in the long term (Ghana National Environmental Policy, 2012). The aim of ECEE is to inculcate in children “a strong sense of environmental, social, and economic awareness, with emphasis on protecting the environment” (Ministry of Education, 2019, p. vii).

4.4.9 IEK and decolonizing ECEE.

The issue of decolonizing ECEE centers on the question of “what is considered legitimate knowledge” (see Akena, 2012, p.599). Akena (2012) further observed, “European colonizers have defined legitimate knowledge as Western knowledge, essentially European colonizers’ ways of knowing, often taken as objective and universal knowledge” (p. 600). “From an educational perspective, it means unlearning much of what dominant culture and schooling teaches and learning more socially just and ecologically sustainable ways of being in the world” (Gruenewald, 2003, p. 9).

Based on this, Dei and Simmons (2011) concluded that because decolonization is oriented as a counter hegemonic process, “then we ought to speak about indigenous philosophies and the link to schooling and education” (p. 98). The inclusion of Indigenous content in education develops awareness among students of the existence of IKs as legitimate knowledge (Chinn, 2007; Dei, 2000). The creation of awareness among students of the existence of IKs can lead to decolonizing (Dei, 2000). It makes students aware that there are other legitimate ways of knowing. Hence decolonizing EE in Ghana means indigenizing or integrating Indigenous worldviews into EE. Again, Dei and Simmons (2011) concluded “So in the African context, educational philosophies for decolonization must consider relevant knowledge that local peoples come to know as their own” (p. 99).

I observed that the integration of IEK into ECEE in Boania Primary School helped legitimize the knowledge. For example, children became aware that IEK (which we referred to as

home knowledge) can also be taught in schools. It became evident that the dichotomy between living and non-living also includes relationships with nature and spirituality. Hence IEK challenged the DW knowledge in ECEE curriculum. It provided a "counter hegemonic discourse" (see Odora Hoppers, 2002, p. ix), by "unlearning much of what dominant culture and schooling teaches" (Gruenewald, 2003, p. 9). This was observed during one of the outdoor activities with the female Elder. One of the children, whose grandmother happened to be the Elder said "I did not know that my grandmother was a teacher" (pupil 4, participant observation notes, February, 4th 2020). By inviting Elders into classrooms to teach ECEE, the children suddenly became aware that the DW definition of a teacher was actually questionable. This awareness is what decolonization aims to achieve. Respect for Indigenous knowledges will eventually be restored, once it is realized that they are equally important ways of knowing to DW scientific ways of knowing. By extension, decolonization does not seek to challenge and reject DW-K alone, but it also seeks to recover and renew sustainable traditional and non-capitalist cultural behaviors (Bowers, 2001; Gruenewald, 2003).

4.5 Conclusion

Efforts are being made globally to integrate Indigenous content into ECEE. I examined the Indigenization of ECEE in the context of Ghana and presented the outcomes.

In terms of pedagogy and curriculum, domains of knowledge are not divided under IEK. Unlike the current ECEE curriculum, IEK is holistic, not separated into separate different subject areas, and topics. IEK includes spiritual dimensions of nature where the ECEE curriculum does not. As a result, the Elders employed spirituality and ancestral worship in teaching nature whilst religion exists as a subject, separate from environmental studies in the ECCD curriculum. Curriculum outcomes are also different between the two teachings. Regarding pedagogy, the Elders' teachings were more casual, less structured, and gave children the freedom to explore nature at their own pace. It is also important to note that times and seasons influence the teaching of certain types of IEK.

I also observed that getting outdoors into the community, or onto the Land, was required for the teaching of IEK, and the teacher learned that this was a great way to teach EE. Similarly,

the integration of IEK into ECEE also helped connect children more to nature through the adoption of more experiential and outdoor approaches to suit IEK. But the lack of regular outdoor activities in the school does not mean children are not in regular contact with nature. Being a rural community, children play outdoors after school. What was not clear, however, was whether sustainability outcomes were being achieved in after-school outdoor contact with nature. The integration of IEK into ECEE supported the children's learning in meeting environmental realities because knowledge taught was context-related or place-based. Also, children learned about nature more from their peers and outside the school environment than from the teacher and sometimes parents. Again, the teacher's understanding of ECEE improved through the study. She realized topics under ECEE extended beyond what was in the curriculum when child driven.

Ontologically, the community had a strong relationship with nature, and they saw nature through that relationship. They "belief that the very survival of the human race is tied to the very existence of nature and the environment" (Darko, 2014, p.185). The community had relationships with sacred crocodiles, trees, and other forms of creation. This relationship is sometimes equal to a relationship with a family member. There was no separation between the spiritual and physical (see Datta, 2015). Again, there was a strong connection to Land, and permission is sought from the Land before the community embarks on any activity. Humans can learn from other forms of creation (chameleons and trees) on how to live with nature. These lessons are some of the intangible things that humans got from nature. By highlighting how close the community's relationship to nature is, the Elder's teaching "reshapes abstract understandings of nature and land" (Seawright, 2014, p. 570).

I suggest that for ECEE to succeed in Ghana, it must find ways to incorporate Indigenous content, especially, IEK into programs. I observed that, albeit they differ in cosmology and worldview when integrated into ECEE, IEK makes the program meet the best practice recommendations put forward by the NAAEE (2010). Importantly, IEK possesses the cultural framework of respect, reciprocity, and responsibility towards nature, which, when taught and learned, can enhance sustainability outcomes in children and therefore in the future.

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Contributions: John Bosco Acharibasam [conceived of the presented idea, collected, and analyzed data/ prepared/designed/drafted, and reviewed the paper].
Dr. Janet McVittie [encouraged, / supervised the findings of this work/ edited and made suggestions].
John Bosco Acharibasam wrote the paper from his research, but both authors discussed the results and contributed to the final manuscript.

CHAPTER FIVE- TWO-EYED SEEING AS PEDAGOGY: I WILL USE THE LEFT HAND IN SCHOOL AND THE RIGHT-HAND AT HOME.

5.0 Introduction- Early Childhood Education

Globally, scholars (see Ball, 2010; Dahlberg & Moss, 2005; Gergen, 1992; Nsamenang, 2005, 2007; Nsamenang & Tchombe, 2011; Pearson & Degotardi, 2009; Pence & Nsamenang, 2008; Pence & Shafer, 2006) have concluded that the practice of Early Childhood Education (ECE) has been informed and dominated by theories developed in dominant Western (DW) contexts without any consideration of Indigenous child-rearing and education. Similarly, in Ghana (and more broadly sub-Saharan Africa), DW knowledge (DW-K) dominates Indigenous content in ECE, also known as Early Childhood Care and Development (ECCD) (Abdulai, 2016; Donkor, Issaka, & Asante, 2013; Hyde & Kabiru, 2003; Ng'asike, 2014; Nsamenang, 2005; 2007; 2008; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008; Pence & Shafer, 2006; Tackie-Ofosu, Mahama, Vandyck, Kumador, & Toku, 2015).

As a result, several scholars have advocated for the inclusion of Indigenous knowledges (IKs) in the curriculum and pedagogy of ECCD (Abdulai, 2016; Donkor, Issaka, & Asante, 2013; Ng'asike, 2014; Nsamenang, 2005; 2007; 2008; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008; Pence & Shafer, 2006). This advocacy emerged not out of doubt over the importance of DW-K but because they realize that for education to be effective, it must reflect the cultural realities of children (see United Nations International Children's Emergency Fund, 2004; United Nations, 2005; Cole, Hakkarainen & Bredikyte, 2010). As Dei and Simmons (2011) queried, "what does it mean for educational philosophy to reside within conventional classrooms and as being devoid of the lived experiences of the learner?" (p. 98).

Another reason for the call to integrate Indigenous content into ECCD stems from the observation by scholars (see Fakudze & Rollnick, 2008; Fakudze, 2004; Jegede, 1995; Ogunniyi, 1995) that when students from rural communities start formal school, they do not completely abandon their IKs in favour of DW-K, but instead tend to seek ways of holding onto both knowledges. To enhance their transition from the home environment to the school environment

and to prevent what Battiste (2000) and Martin (2012) call "cognitive imperialism", both knowledges must be explicitly taught to children. This way, children could make informed choices about which knowledge applies in each unique situation, and how to blend the two knowledge systems. Jegede (1995) observed that students are required to function in these two worlds. Hence "the differences in the worlds would require them to move back and forth from one worldview to another" (Fakudze & Rollnick, 2008, p. 80).

More importantly for this paper, IKs have unique knowledge regarding sustainability. As Dei (2000) noted, those who lived in a place for a long time are those with the most understanding of how to live there sustainably. According to Shiva (1997),

> The real meaning [of sustainability] refers to nature's and people's sustainability. It involves a recovery of the recognition that nature supports our lives and livelihoods and is the primary source of sustenance. Sustaining nature implies maintaining the integrity of nature's processes, cycles and rhythms (p.192).

Despite the surge in calls to integrate Indigenous content into ECCD, there have been a few studies examining the methodological framework for integrating Indigenous content into ECCD in Ghana, a gap this research sought to fill. Nadasdy (1999) noted many works continue to advocate the use of IEKs and their integration into programs without proposing a method for achieving this. Given the power imbalances that exist between IEK and DW-K, scholars have cautioned against the danger of one knowledge dominating the other (see Kim & Dionne, 2014; Sundar, 2002; McCarter, Gavin, Baereleo, & Love, 2014). That is: one knowledge form can be privileged over the other (see Kovach, 2009). Based on this, the methodological framework that is adopted to integrate IEK into ECCD is important. Therefore, a two-eyed seeing approach was adopted to help integrate IEK into ECCD, without further privileging DW-K. The themes that emerged from adopting a two-eyed seeing methodology to integrate IEK into ECCD are presented in this paper. The paper received ethical approval from the University of Saskatchewan ethics office and the Ghana Education Service.

5.1 Methodology: A Two-Eyed Seeing Indigenous Approach

The bringing of DW-K and IEKs together poses its own challenges. One of these challenges is the possibility of further entrenching the already existing unequal power relations between the two knowledges (Nadasdy 2007 as cited in Bohensky & Maru, 2011). In other words, the integration of the two knowledges may lead to DW-K's further domination over IK. This is especially, likely in a situation like Ghana, where the educational system already privileges DW-K over IEK. Based on this concern regarding privileging of DW-K, Kovach (2009) stated that "how we make room to privilege both, while also bridging the epistemic differences, is not going to be easy" (p. 29).

Therefore, I adopted the two eyed seeing Indigenous methodology; I thought it would prevent the further privileging of DW-K over IEK. The concept of two-eyed seeing grew out of the teachings of the late chief Charles Labrador of the Acadia First Nation in Nova Scotia, Canada (Greenwood, de Leeuw, Lindsay, & Reading, 2015). Acadian First Nation scholars, Albert and Murdena Marshall, (Bartlett, Marshall, & Marshall, 2012) formalized the concept for educational purposes. The concept is currently seen as a guiding principle for walking in two worlds (Greenwood, de Leeuw, Lindsay, & Reading, 2015).

The two-eyed seeing approach espouses the idea that IKs and DW-K can co-exist in an educational setting. Metaphorically, children learn to see from one eye with the strengths of IKs, and the other with the strengths of DW-K, and students are encouraged to use both eyes together, for the benefit of all (Bartlett, Marshall, & Marshall, 2012). According to Martin (2012), two-eyed seeing holds the view that no one perspective is right or wrong; all views are seen to contribute something unique and important. As a result, conflicts between the two ways of knowing are avoided since "differences are recognized and embraced" (Martin, 2012, p. 35). This approach is "an inclusive philosophical, theoretical and methodological approach" (Marsh, Cote-Meek, Toulouse, Najavits, & Young, 2015, p. 3-4) because it adopts both DW-K and IKs not as two conflicting knowledge waves but as two distinct epistemological systems that can exist side by side (Bartlett et al., 2012; Iwama, Marshall, Marshall, & Bartlett, 2009). It

emphasizes that teachers develop cultural respect for both worldviews in the teaching processes (Iwama, Marshall, Marshall, & Bartlett, 2009).

Furthermore, a two-eyed seeing approach "seeks to avoid knowledge domination and assimilation by recognizing the best from both worlds" (Hatcher et al., 2009, n. p.). Martin (2012) stated that the approach values differences and contradictions rather than the "melding of diverse perspectives, which can result in the domination of one perspective over the others" (p. 31). A two-eyed seeing methodology also recognizes IKs and Indigenous education philosophies on their own terms, as valid ways of teaching and learning, equal to their Euro-American counterparts (Simpson, 2002). Kapyrka and Dockstator (2012) observed that irrespective of the philosophical differences between the DW sciences and IKs, there exists a window of opportunity to employ the two together. Equally, Martin (2012) stated that "As a concept that values both Western and Indigenous ways of thinking, two-eyed seeing embraces diverse understandings of reality" (p. 32).

The two-eyed seeing approach fits the Ghanaian (and African) context. Since Ghana (and more broadly Africa) encountered Europeans, belief systems have changed. Bhabha (1985) concluded that post-colonial Africa does not have a unitary set of discourses about education but rather a variety of different hybrids, a third space where local African and DW images meet in weavings that have their own implications and configurations. Likewise, in the Ghanaian context, scholars have observed that there exists a heterogeneous knowledge system also referred to as two ways of seeing (Adjei, 2007; Dei, 2000). Two-eyed seeing is even more evident in schools, with Le Grange (2007, p. 581) observing "In Africa, schools are the sites where most learners first experience the interaction between African and Western worldviews". Based on this, Onwauchi (1972) concluded that the typical African child lives in two worlds (IKs and DW-K ways), the school environment, and the home environment.

Nonetheless, as Adjei (2007) observed, DW-K or ways of seeing are being promoted more and dominate Indigenous ways of seeing in Ghanaian schools. Therefore, scholars (Adjei, 2007; Dei, 2000; Gyekye, 1996; Jegede, 1994; Kanu, 2007; Le Grange, 2007; Ndofirepi, 2011), suggest that Africa (including Ghana) finds ways to prevent the continuous promotion and

domination of education by only DW-K or ways of seeing. Dei (2004) cautioned that care must be taken not to continuously promote DW-K over IKs as the only valid knowledge in Ghanaian schools.

The research for this paper does not call for wholesale adoption of past IKs to the complete rejection of DW-K in ECCD. As Boateng (1983) stated,

> while a wholesale revival of the past is unrealistic and unacceptable, this writer wishes educational planners to note that a total rejection of the African heritage will leave African societies in a vacuum that can only be filled with confusion, loss of identity, and a total break in intergenerational communication (p.335-336).

Hence, without completely reviving the past, a two-eyed seeing approach should be introduced, because it gives equal opportunity to both knowledge systems to exist. Thus, a two-eyed seeing approach was adopted for the study.

5.1.1 Setting.

As noted in chapter three, the study into the integration of IEKs into ECCD took place in Boania Primary School of the Upper East Region of Ghana. Two reasons influenced the selection of Boania Primary school for this study.

First was the belief that being a rural school, IEK would still be present. Scholars observed that Africa's IKs are fast diminishing, but remnants still exist in rural areas of the continent (see Masuku Van Damme and Neluvhalani, 2004). The chosen District, Kasena-Nakana West District has about 79% rural population (Ghana Statistical Service, 2014), making it likely that IEKs could still be robust.

I found out that Boania, consisting of the Kasena ethnic group, still relies heavily on IEKs for survival. The Kasena are a collection of people speaking Kasem, a language of the gurusi sub-branch (Awedoba, 2000). The ethnic group is geographically located in Northern Ghana and Burkina Faso. Kazaresam (1975, as cited in Aketema, 2017) explained that colonial border divisions between France and Britain affected the Kasena ethnic group. Emerging from the Berlin treaty, France and Britain reached an agreement on the boundary between Ghana and Upper Volta (now Burkina Faso) in 1898 (Kazaresam, 1975, as cited in Aketema, 2017).

Consequently, the Kasena ethnic group was divided into two groups, one group belonged to the British in Ghana whilst the other group belonged to the French in Upper Volta. It must therefore be noted that the IEKs presented in this paper do not represent the IEKs of all the Kasena ethnic group. Rather, the paper focuses on the IEKs of the Kasenas of Paga Buru Boania in Ghana.

One area where IEKs are heavily used is in traditional agricultural practices. Farming in the community is still rain-fed and uses traditional farming technologies (IEKs) that have existed for many years. According to Obiora and Emeka (2015), African IEKs are found in the peoples' understandings of ecosystems and traditional modes of agriculture. Hence the community still relies heavily on the Land and IEKs for survival. It is shaped by their worldview, culture, environmental ethics, farming practices, and religion. This can be found in their traditional medicine, farming, spiritual rituals, cultural, and religious practices, social taboos, traditional medicine, and totems that guide the community on how to relate to nature (see Mathooko, 2005). As Awariwe said, "the people farm to sustain themselves, they are not known for trade, manufacturing or industrial work" (male Elder, participant observation notes, February 11th, 2020). They live on the Land and its natural resources which include: the Land, trees, animals, water bodies, and the air. Parrota and Trosper (2012) observed that IEKs' survival is at risk when there is a reduced dependence on the Land for rural survival. But in the case of Boania, the community is still heavily reliant on the Land and nature for survival. As articulated by Githiru (2007), "There is a great deal of resilience in Africa, and there is also real hope for the environment because many rural people still rely directly on it" (p. 1210).

The second reason for the selection of a rural school was the fact that the research adopted a two-eyed seeing Indigenous approach. Scholars (Mazrui, 1986; Nsamenang & Tchombe, 2011; Pence & Nsamenang, 2008) have observed that education (including ECE) in Ghana and Africa falls under three overarching educational systems. These include the Indigenous African educational system, the Islamic-Arabic educational system, and the DW-Christian educational system based on the Euro-American education models. Since Boania was colonized to be Christian and has minimal Islamic influence, this study focused on the Indigenous African Educational system and the Euro-American education model. In the KG2

which was selected for the study, only one student out of a total number of 20 pupils bore an Islamic name. But upon further inquiry, I learned that this student was not a practicing Moslem. The rest of the names were either listed as Indigenous Kasena names or DW Christian names but all pupils with Christian names still had Indigenous Kasena names.

Qualitative research methods of participant observation and in-depth interviews were adopted to collect data. Thematic analysis was also adopted to analyze data and below are the results from both the participant observation data and the interview data.

5.2 Summary of Results

5.2.1 Participant Observation Data.

This section presents observations of learning activities with the teacher in the classroom and the Elders on the Land. I met to discuss the topics with the Elders days before each visit. Nonetheless, the Elders taught the concepts and topics their way. For example, in the week the class treated living and non-living things, the male Elder focused on the Land and the history of Boania Primary School. According to him (male Elder, participant observation notes, February 11th, 2020) knowledge of the Land was very important for the children to appreciate all that nature has given to them. The Elder commented that, once pupils understood the history of the Land and their school, their relationship to the Land would change (male Elder, participant observation notes, February 11th, 2020).

The two Elders alternated their visits, such that if the male Elder visited one week, the female Elder visited the next week, both to teach IEKs in the outdoors. This involved taking the children out onto the Land /farm for their learning. I was present on all school visits and outdoor activities to observe events and to take pictures. The teacher, on the other hand, taught these topics as they appeared in the curriculum in the classroom. The reason why these Elders were invited was to create an avenue for the Indigenous knowledge holders to teach children directly and to attempt to prevent knowledge domination (see Kim & Dionne, 2014; Kim et al., 2017). The Elders who are the true holders of IEKs were invited into the classroom to teach children.

The teacher taught curricular science content (environmental science subjects) once a week. This was either a day or hours before the Elders' visit to the school and this took place in

the classroom. It must be noted that the teacher is not the “true” knowledge holder of DW science knowledge (a scientist). But she drew on textbooks and curricular materials that are based predominantly on science. The summary of planned learning activities is presented below.

Table 5.1 Learning Activities with the Teacher and Elders

Female Elder	Male Elder	Teacher
February 2nd to February 8th , 2020	*February 9th to February 16th , 2020*	*February 9th to February 15th, 2020*
Trees and the roles they play in the Kasena woman's life in the community of Boania. Children went outdoors and identified different species of trees and their uses. They learned about the making of shea butter, dawadawa, mortar, pestle, fuelwood, and fruits (under the topic of living and non-living things).	The Land and the history of Boania Primary School. Tracing the history of the school from under the tree where it first started to its present-day location. Identifying different farms and the plants that were grown on them during the rainy season after harvest (under the topic of living and non-living things).	The teacher and her pupils examined the dichotomy between living and non-living things. The teacher brought along to the class posters/pictures of living (different plants, grass, and animals) and non-living things (stones, bags, spoon, table, and buildings). The children were taught the characteristics of living things vis-a-vis non-living things. Teaching was in class. The children were graded on their performances (drawings). Teaching was more structured, and children raised hands before they answered questions. Due to the small nature of the classroom and limited learning materials (such as slates, pencil sharpener, books, coloured pens, dusters), there was fighting during lessons in the classroom and arguments erupted. In class, fighting became more pronounced during environmental studies where there were more drawing and a greater need to share learning materials.
February 16th to February 22nd, 2020	*February 23rd to February 29th, 2020*	*February 23rd to February 29th, 2020*

Identifying trees used for fuelwood and those forbidden to burn. Identifying elephant grass and straws used in making traditional mats, bags, and baskets. The planting of the kenaf plant [Hibiscus cannabinus] and processing it into bast fibre. For making items such as ropes, mats, baskets, and bags (under the topic of living and non-living things).	Identifying trees in the community, their traditional names, and uses. He also taught the making of bast fibre from the Kenaf plant (under the topic of living and non-living things)	History of Boania, community, taboos, beliefs, and worship as well as responsibilities of the chief. On the 25th of February 2020, the class KG2 [together with KG1] visited the chief's palace (under the topic of my local community).
March 1st to March 7th, 2020	*March 8th to March 14th, 2020*	*March 1st to March 7th, 2020*
Traditional sources of good drinking water before the coming of the borehole to Boania. Visiting the river, Daa buga (under the topic water)	Harvesting termites for chickens and the role of the chicken in Kasena ceremonies (under the topic living and non-living things). The Elder intended to teach on the topic of water, but could not because the research stopped due to COVID 19.	The teacher taught on sources of water and its uses. A class activity followed by which the children were asked by their teacher to draw and form sentences on the sources and uses of water. One of the goals was to have children use some keywords (relating to water) to make simple sentences. Teaching was in class.
Four topics could not be treated due to COVID 19		

From the field activities, I observed themes such as spiritual connection to the Land (nature and the other entities), women's connection to the Land, men's connection to the Land, and practical uses/ gifts from the Land, curriculum and ontological differences.

5.2.1.1 Themes

First is the spiritual connection that Kasena have to Land. Land is considered a female, god, and mother (see Atuguba, 2018). The connection with the Land, extends beyond the living because Land serves as the conduit through which the community communicates with the

ancestors (male Elder, participant observation notes, February 11th, 2020). Based on this everything relating to Land is considered spiritual and sacred. As the male Elder stated, permission is sought from the Land through the pouring of libation before any activity takes place in Boania (male Elder, participant observation notes, February 11th, 2020). Similar to Parrota and Trosper's (2012) observation, the community believes that a person's connection to the Land is permanent and cannot be broken. An example of the integral role of the Land is that the Land is used for arbitration purposes as soil from the Land is mixed with water for the two parties to drink (male Elder, participant observation notes, February 11th, 2020), in a process called to drink the Land (ba yo tigaa). In terms of totems, crocodiles are held as sacred and are seen as ancestors. But the Kasena also believe that the environment (sacred groves) houses the spirits of their ancestors (see Atugba, 2018; male Elder, participant observation notes, February 11th, 2020). Before any of these became the community's way of life, spiritual confirmation was sought through divination (male Elder, participant observation notes, February 11th, 2020).

Second is women's connection to the Land. Although the Land is considered a female, the community of Boania is patriarchal as only males can inherit Land (male Elder, participant observation notes, February 24th, 2020). Hence, culturally, males have primary rights to Land through ancestral inheritance (see Doghle, King, & Akaabre, 2018). Women access Land through their husbands or brothers. In the situation of a widow, the woman is entitled to the late husband's property (Land) for as long as she remains in the late husband's house. Similarly, when a girl remains unmarried, the brothers must share the family Land with her (female Elder, participant observation notes, February18th, 2020). But women's ownership of Land is still limited since they cannot sell or transfer the Land to another person. As a result, there are gender divisions in men and women's connections to Land. In farming, some actives are limited to females. The growing of vegetables, sowing of seeds (millet), and harvesting of certain crops are limited to females. These activities also influence women's connection to the Land in the community and their IEK. Again, some activities such as shea butter processing, dawadawa processing (from *Parkia biglobosa*), the making of traditional mats, and clay works, use of the mortar and pestle, fetching of fuelwood, fetching of water, some herbs, the plastering of mud

buildings and art design are limited to only females (female Elder, participant observation notes, February 4th, 2020). I observed these gender divisions in the types of IEK that was taught in the research. Most of the knowledge taught by the female Elder was activities limited to only females in the community.

However, the Elders observed that recent times have witnessed an increase in women's' access to Land and in the growing of crops that were limited to men. Even dry season gardening, which was predominantly a male-dominated industry, has seen higher female participation. Except for the pouring of libation, there are no strict rules preventing women from participating in these other activities. For example, a woman cannot be punished for participating in dry season gardening or making holes to sow her millet. It is rather in the rearing of animals, specifically cows, that women's participation is still limited in the community.

The third is men's connection to the Land. In Boania men's connection to the Land emerges from inheritance and a man is connected to his ancestors through the family Land (male Elder, participant observation notes, February 11th, 2020). Hence men worship these ancestors through the regular pouring of libation on the family Land. Land is considered a private property. Some farming activities are also male dominated. Especially, more physical farming activities (use of more muscle) such as mulching or the digging of dug-out wells for dry season gardening are limited to men (male Elder, participant observation notes, February 11th, 2020). Similarly, the growth of certain crops such as millet is limited to men (male Elder, participant observation notes, February 11th, 2020). Activities such as the processing of bast fibre, wood carving, the pouring of libation, and the rearing of cows are also limited to men (female Elder, participant observation notes, February 18th, 2020). Taboos concerning what type of animals to hold as totems and trees not to burn for fuelwood are set by men (male Elder, participant observation notes, February 24th, 2020). These gender stratifications showed in the two Elders teaching of IEK. Some of the things taught by the male Elder are activities limited to only men.

Fourth is practical uses or gifts from the Land. As indicated earlier, the community is heavily reliant on the Land for survival. Practical uses of Land refer to the gifts that the community got from the Land. These are both tangible and intangible. The tangible gifts from

the Land include food, shea butter, shade, fuelwood, medicine, water, wood for building homes, dye for fabrics, and wood for carving. The intangible gifts are that the Land serves as a conduit for communicating with the ancestors and teaches the community members how to live sustainably with other forms of creation (male Elder, participant observation notes, February 11th, 2020). Nonetheless, these practical uses also have a spiritual dimension as permission is sought from the spirits before any of these gifts can be used (male Elder, participant observation notes, February 11th, 2020). Sometimes the spirits even determine some of these practical uses such as traditional medicine. As Thabede (2008) concluded, "Africans regard supernatural causes as the explanation for everything" (p. 235). Hence there is no clear separation between practical uses and spiritual dimensions of the Land. Even with the practical uses, Land and trees are not viewed as properties or natural resources that can be bought or sold.

Fifth is curriculum and pedagogical implications. In teaching IEK, all forms of knowledge were taught holistically. Maurial (1999) stated, "one important basis of an Indigenous worldview expressed through Indigenous Knowledge is holisticity" (p. 63). Based on this, forms of knowledge are not divided into different disciplines. Therefore, the Elders employed religion and spirituality to explain environmental studies topics. However, forms of knowledge were divided into different subjects in the ECCD curriculum. As a result, the teacher did not employ religion and spirituality in teaching environmental topics. For the Elders, the teaching of IEK was not based on a single activity. For example, whilst the class was on the way to the tamarind tree under which Boania Primary school first started, the male Elder took time to identify different farms and the types of plants that were grown on them. Similarly, whilst on the way to the river to dig for water, the female Elder also identified elephant grass with the children, a topic she had taught the previous weeks. The teaching of some IEKs was also time-bound. Activities such as going to the forest to collect fuelwood, shea nuts, and the harvesting of termites are normally done in the morning.

Last is on ontology and epistemology. The two Elders drew from an Indigenous ontology and epistemology to teach concepts. Hence, this was holistic combining all forms of knowing to teach concepts. Again, the Elders' teachings showed a strong relationship to nature and the

community of Boania. Consequently, the Elders introduced the children to an Indigenous African worldview which is different from the DW worldview contained in the ECCD curriculum. Van der Walt (1997 cited in Thabede, 2008) argued that "African thought exists and differs from Western thought in that Western thought generally ignores the spiritual dimension of phenomena and focuses on the visible, measurable physical reality" (p. 235). Hence Thabede (2008) concluded that "African ontology is concerned with the spiritual world and the forces that play a role in it" (p. 235). This explains why, unlike the teacher, the Elders employed religion, spirituality, and ancestral worship to explain concepts.

Overall, the above themes emerged from the participant observation data. In summary, the themes are the spiritual connection to the Land (nature and the other entities), women's connection to the Land, men's connection to the Land, practical uses/ gifts from the Land, curriculum and pedagogical implications, and ontological and epistemic differences.

5.2.2 Interviews with Thematic Analysis.

Interview data consisted of audio recordings, typed transcripts of audio recordings, and the interviewer's notes. The notes documented observations about the interview content, the participant, and the context (Mack et al., 2005). Audio recordings were transcribed by me because data analysis begins with transcription. Bailey (2008) for example, stated that the representation of audible and visible data into a written form is an interpretive process and is the first step in analyzing data. The themes that emerged from the Interview data are presented below.

5.2.2.1 General understanding of Boania's IEK.

The Elders and the teacher all saw Kasena's IEK to defy a single definition as there is no single word in the language, Kasem, for IEK. The Elders saw it as a way of life. As Darko (2014) noted, "there is little or no distinction between what Indigenous people learn and how they live their lives" (p. 201). The Kasena term given to it is our ancestor's way, a term that is also used for other forms of Indigenous knowledges. McGregor (2005) made a similar observation in her study of the TEK of the Anishnabe, by stating that TEK defies a single

definition because it is a way of life. There is no specific age at which the learning of IEK began and some IEKs are time-bound. A difference between the Elders and teacher about this theme was that the Elders saw IEK more as a way of life whilst the teacher saw it as knowledge that can be acquired. Also, the different stratifications of IEK came out much more clearly in the Elders' responses. Gregoire and Lebner (2001) observed IEK is socially-differentiated according to gender, age, occupation, socio-economic status, religion, and other factors. All the nine pupils understood IEK (also referred to as home knowledge) as activities that children undertook when they learn about the environment with Elders and at home. Among the activities were: climbing trees, eating fruits, learning how to dig for water at the stream, harvesting termites for chickens, walking around and naming trees and their uses, using elephant grass to make mats, and the processing of bast fibre.

5.2.2.2 ECCD and the marginalization of IEK.

The Elders and teacher all agreed current ECCD practice has marginalized the IEK of the community. The community of Boania had limited input in the design and implementation of the curriculum under which their children are taught in ECCD. The curriculum came from Ghana Education Service (GES) in Accra; hence the community has limited input. Besides, the way the school system has been set up privileges DW-K over IEK. Some IEKs (harvesting of termites, collecting fuelwood, and shea nuts) are time-bound and cannot be taught due to the current school system. Therefore, curriculum and pedagogy of ECCD both privilege DW-K over IEKs. Commenting on this, the teacher noted that DW-K is favoured over IEK because "it is believed that to make it in life and for Ghana to develop, school and DW-K are the ways to take" (teacher, interview [1] transcript, February 1st, 2020).

The teacher's comment confirms Adjei's (2007) conclusion that DW-K has become "the cultural capital by which individuals could access employment in both state and private organizations in Ghana" (p.1048). I observed that all the outdoor learning activities the Elders taught the children could not be found in the ECCD curriculum and pedagogy. Important ways of life that the children need to grow into responsible adults in the community of Boania cannot be found in the ECCD curriculum. Without learning how to treat the Land as sacred and to seek

permission from the Land before taking from it, through the pouring of libation, a child may never grow to form a stronger bond and respect for the Land. In line with this Cajete (1994) argued that an "unexamined application of DW education can condition people away from their cultural roots" (p. 17). To integrate IEK into ECCD, a methodology that does not further privilege DW-K over IEK, was therefore necessary.

5.2.2.3 Integrating Kasena's IEK into ECCD using a two-eyed Indigenous approach.

The Elders and teacher had not heard of the two-eyed seeing methodology before this research. But they all said after I explained the methodology to them that it was a suitable approach to integrate IEK into ECCD without further privileging DW-K. The female Elder, for example, stated

> I have never heard of this method before, but it can help include IEK in ECCD. Yes, both can be taught concurrently because we cannot say our children should stop school and learn our IEK alone. Both knowledges are needed for the development of the child and will help the children have a balance in life. What if the school does not work out for the child, then what next? But teaching her our ways gives her a balance and security in life. If the school does not work out, she can fall on our IEK to make a living (female Elder interview [1] transcript, January 29th, 2020).

A difference between them about this theme was that whilst the Elders saw the two-eyed seeing approach to give a balance to children's lives, the teacher thought the approach would provide a methodological framework to guide the integration of Indigenous content into education in Ghana. The children also understood the differences in learning environmental topics with the Elders and with their teacher in class. Hence children saw concepts from one eye with the strength of IEK and the other with the strength of DW-K differently. As a result, they were able to categorize different learning activities under these two eyes.

5.2.2.4 Outcomes that emerged due to the inclusion of IEK ECCD in Boania Primary School.

There were five outcomes that the research participants noticed from using a two-eyed seeing approach to integrate IEK into ECCD. These outcomes are discussed below.

First, the centering of IEK in ECCD helped unsettle and resist DW-K domination of ECCD in Boania Primary School. Scholars have observed that the inclusion of Indigenous content in curricula and pedagogy help unsettle and resist DW-K domination (Dei, 2004; Dei and Simmons, 2011; Nsamenang, 2007; Ritchie, 2012). Dei and Simmons (2011) for example showed how IK resists and operates counter-hegemonic to DW-K when integrated into education. The Elders and teacher said this was achieved as DW-K's privileged position as the only valid knowledge was challenged. For example, involving Elders challenged DW definition of a teacher as the children became aware that it was not only the teacher that could teach them about the environment. As well, the children got to know that the features for classifying living and non-living things also involved relationships with nature.

Second, it helped decolonize and create respect for Indigenous people and their knowledge. Both the female Elder and the teacher said the integration of IEK into ECCD helped decolonize ECCD and create respect for Indigenous people and their knowledge. The male Elder agreed respect for them was achieved but was not as convinced about decolonization. According to him, IKs have been suppressed for so long. Therefore, the study was too short in duration and limited in scope to achieve decolonization. He commented "to some extent, decolonization was achieved but due to the one-term nature of this study and the fact that it is only KG2, one cannot directly say that it has helped decolonize early childhood education in Boania Primary School" (male Elder, interview [2] transcript, March 19th, 2020).

The male Elder's understanding of decolonization, therefore, varied from the female Elder's and the teacher's. The latter seemed not to be much influenced by duration and scope in their understanding of decolonization. To them once the study challenged DW epistemological dominance, created respect for the Elders, and helped children unlearn what DW-K has taught them about nature, then decolonization was achieved.

Third, the integration of IEK into ECCD helped learning to reflect the Ghanaian dual knowledge base. Again, the female Elder and the teacher agreed the two-eyed seeing methodology helped align their teachings to reflect children's realities. The female Elder for example observed similarities between her teaching and that of the teacher's. As she stated: "I realized that we could actually align our IEK and what is taught in school to help the child understand topics taught" (female Elder, interview [2] transcript, March 18th, 2020). In contrast, the male Elder observed no similarities in their teachings. According to him, what he taught were things that the children did not know before and so gave the children a different dimension to view nature. As he argued: "the children did not know much about our IEK. Even the names and uses of the trees around them most of the children did not know. But through our teachings and outdoor activities, they got to know most of the trees and their traditional uses" (male Elder, interview [2] transcript, March 19th, 2020).

One possible reason for these different responses could be found in the kind of IEK taught by the two Elders. Some of the IEK the female Elder taught were activities the children saw on daily basis. Activities such as shea butter processing, clay works, processing of dawadawa, and the making of local mats (from elephant grass) were the major occupation of most women in Boania. It was therefore possible that the teacher also employed such examples in teaching classroom topics. However, the IEK knowledge the male Elder taught were not everyday things the children saw. Activities such as the pouring of libation and the processing of bast fibre are not daily activities. Besides these IEK were limited to males. Based on this, it was possible the children did not know these IEKs before the male Elder's teachings.

Fourth IEK enhanced love for nature and achieved environmental sustainability outcomes. The Elders and teacher said this outcome was achieved. To them after learning about the importance of the environment (the gifts from nature) to the community, the children would never destroy it. Pupil-5 for example said, "we learned about trees not used for fuelwood and the man (referring to the male Elder) said some trees are family and we should not fell them" (pupil-5 interview transcript, March 22nd, 2020). In this statement, Pupil-5 noticed that trees are not just there to be used, but are part of the family, to be respected.

A difference between the Elders and teacher about this theme was that besides children loving the environment for its value, IEK itself connected children more to the Land. To the Elders, IEK is a way of life and not abstract knowledge to be acquired. The male Elder, for example, questioned how the school's immediate environment is littered with plastic waste whilst environmental education is taught in their classrooms. Specifically, he said,

> Do you see how the school's immediate environment is littered with plastic waste? Meanwhile, environmental education is taught in their classrooms, and children are taught to keep their bodies and environment clean. If IEK is part of the curricula and regular classroom lessons, the school would be clean and environmental sustainability will be achieved. All our IEK must be integrated into classroom environmental studies lessons to complement western knowledge" (male Elder, interview [2] transcript, March 19th, 2020).

To him, if EE was also a way of life like IEK, it would have reflected in their immediate environment. Knowledge is not separate from the Land. Nadadsy (1999) talked about how DW compartmentalization of knowledge affects how people receive knowledge. It appears environmental knowledge is being received by the students as knowledge only to be learned to pass exams and not to be lived. Hence: the reason why the school is littered with plastic waste whilst environmental education is taught. Ganaa (2011) observed this as a nationwide problem in Ghana. The scholar stated that "It is often expected that students who undergo environmental education in school should be very much conscious of the environment so as to influence others positively" (p. 15). However, Ganaa (2011) concluded that "this is not the case in most communities in Ghana" (p. 15), since "students do not show any sign of education as they join the numerous Ghanaians to litter the streets around with waste material once they get off the school campuses" (p. 14).

Fifth, the Elders and teacher said it helped preserve IEK as a knowledge form. The teacher commented

> this was achieved because when we teach IEK to the younger ones they will grow and also teach their children. For example, when the female Elder asked the children to

> inquire from their parents' trees that each household tabooed burning for fuelwood. All the children came back with answers. Anytime I give them homework most of the children do not do it because they have no one to help them at home (teacher, interview [2] transcript, March 19th, 2020).

The male Elder also agreed that it helped preserve the community's IEK. According to him,

> this was how our knowledge was transferred from generation to generation. Some of these things we taught the children we also learned from our Elders when we were young. Besides, most of the activities we did with the children, they did not know them. An example was the harvesting of the termites to feed chickens. They saw it and performed it practically, by teaching the children this knowledge it helps preserve our IEK (male Elder, interview [2] transcript, March 19th, 2020).

Finally, it helped connect the children and the teacher to the community. The idea of IEK connecting people to place is not new and according to Parrota and Trosper (2012), one of the attributes of IEK is that it connects people to place. Parrota and Trosper (2012) argued that one of the ideas of the sacred nature of IEK is "that humans are permanently connected to their places" (p.16). Having been taught the Land, history of the community, and the school, the teacher commented that learning about the Land and the history of the school has given her a deeper understanding and connection to the community. She stated:

> I am not from Boania and so I did not know about the Land and the history of the school. This has given me a greater understanding and anytime I ride my motto-bike by the tamarind tree under which the school first started, I see it different now (teacher, interview [2] transcript, March 19th, 2020).

Although the teacher was not originally from Boania, learning IEK gave her a deeper connection to her new community.

5.2.2.5 Opportunities and challenges for including IEK in ECCD.

On the opportunities, the Elders listed among others the teaching of IEK at home, documentation by writing the knowledge down, audio, and video recording. There was a consensus that since the community cannot get GES to integrate their IEK into ECCD curricular,

either teaching IEK at home or documentation were the best ways to preserve IEK in the community. Besides, if the knowledge is documented it would be easily accessible to the authorities to integrate it into school curricula.

The male Elder for example commented

> The best would be to write this knowledge down if we cannot get it integrated into the curriculum. We can audio or videotape the few Elders who know of our IEK and put it down for posterity. When an Elder dies then the knowledge is not lost. So for me, documentation is another way we can preserve our IEK. Besides, if the documentation is done it will be easier for the government to integrate it (IEK) into ECCD curricula. As we speak even if the government decides to integrate this knowledge into curricula, where will they find the knowledge? But once it is written down it will be easier to integrate into the curriculum. If the government sees those documents and how beneficial the knowledge is to the people, it will have no other option than to integrate it into the curriculum to help generations to come (male Elder, interview [2] transcript, March 19th, 2020).

I however recommend that the documentation process be community-led to prevent knowledge exploitation or separating the knowledge from its context. Leaving the documentation of IEK to only academics and outsiders may have its own issues. As Simpson (2002) observed in the context of Canada, "documenting TEK, or converting it from its Oral form, to one that is both more accessible and acceptable to the dominant society has the impact of separating the knowledge from all of the context (the relationships, the world views, values, ethics, cultures, processes, spirituality) that gives it meaning" (p.139).

The teacher however, suggested that if the government adopted a guiding philosophy or methodology, like the two-eyed seeing approach, for integrating IEK into ECCD, that would make integrating IEK into ECCD easier. She added that a guiding methodology to integrate IEK into ECCD in Boania Primary school would also allow teachers to invite Elders into classrooms to support and validate IEK. She indicated that

> Right now, we do not have any approach like that, if we as teachers were trained with the concept of two-eyed seeing it would have helped us a lot and even make our work easier. We would have had the opportunity to invite Elders into the classroom to teach. Right now, it is very difficult to do that. Even if the Elder agrees to come into the classroom, I will need permission from the headmistress and the circuit supervisor before I can invite the Elder. Also, the Elder may be expecting me to give something at the end of the day. But if GES implemented the two-eyed seeing approach and our curriculum had IEK to all concepts in the classroom that would have made it easier (teacher, interview [2] transcript, March 19th, 2020).

On the challenges, the Elders observed that getting the knowledge integrated into school curricula was a challenge. They argued this is an issue beyond their reach because government agencies determine what should be taught. I observed with the variety in geography and peoples, IEK varies throughout Ghana. To integrate IEK into the curriculum will mean that the curriculum writers would have to ensure that methods for incorporating IEK from different locations can all be accommodated within the curricula. This is one of the challenges that will be faced. The Elders stated that the way the DW school system is set up makes it a challenge to teach IEK. They also acknowledged that it was a challenge to get their IEK respected equally as the DW-K. Additionally, they pointed to the inaccessible nature of IEK by stating that since this knowledge is not documented, it will be hard to access it if ever the government decides to include it in ECCD. The teacher on the other hand stated that the lack of a guiding principle to integrate IEK into curriculum and pedagogy is a challenge. As a result of this, she noted teacher training programs do not train teachers on IKs and Indigenous pedagogies. Inviting Elders into school and offering them gifts after teaching was another challenge she noted. She also observed that making children realize that both IEK and DW-K are equally important was a challenge. The teacher thought the children were overly playful during the outdoor learning activities and did not take the Elders' teachings seriously. But Boileau (2013) stated that when we judge children's behavior with adult's reality we may sometimes miss what is being demonstrated.

Although the children seemed playful, I observed during the interviews that the children remembered (with the help of pictures) most of the things taught by the Elders.

5.3 Discussion - using a two-eyed seeing pedagogical approach for integrating IEK into curriculum alongside (and equal to) DW-K.

5.3.1 Provides a Framework to guide practice

Although the two-eyed seeing methodology originated in Canada (Greenwood, de Leeuw, Lindsay, & Reading, 2015), it fits into the Ghanaian dual knowledge context since it creates the opportunity for both DW-K and IK to be taught side by side, by viewing the two as equally important ways of seeing (Martin, 2012). It serves as a framework to guide teachers' practice, by offering an overarching framework to guide practice. As Greenwood, de Leeuw, Lindsay, and Reading (2015) noted, the approach serves as a "guiding principle for walking in two worlds" (p.17). The Ghana ECCD curriculum encourages teachers to adopt IKs children enter school with (Ministry of Education, 2006). However, there is no approach to guide teachers in integrating these experiences into classroom practice. Therefore, the two-eyed seeing approach helps teachers by serving as a guide for practice. Furthermore, it validates IEK and creates an opportunity for the teacher to engage the services of Indigenous Elders.

5.3.2 Prevents the Compartmentalization of IEK

Further, I identified curriculum and pedagogical implications with the adoption of the two-eyed seeing methodology. In teaching IEK, all forms of knowledge were taught holistically thereby avoiding what Nadadsy (1999) referred to as compartmentalization of IEK. This affects how people receive knowledge as it makes them think knowledge is something abstract and separate from the way they live. Maurial (1999) stated, "one important basis of an Indigenous worldview expressed through Indigenous Knowledge is holisticity" (p.63). Based on this, forms of knowledge are not divided into different disciplines. There was no separation between religion and the environment/Land. Therefore, the Elders employed religion and spirituality to explain environmental studies topics. The children were taught that holding nature sacred and being respectful towards other forms of creation is part of environmental lessons. However, forms of

knowledge were divided into different subjects in the ECCD curriculum. As a result, the teacher did not employ religion and spirituality in teaching environmental topics.

5.3.3 Two-eyed seeing Methodology connected learning to children's realities

The two-eyed seeing methodology connected learning to children's realities. I observed that the integration of IEK into ECCD made what children learn meet the realities of their communities because knowledge taught was context-related or place-based (Kim, Asghar & Jordan, 2017). From the female Elder's teaching on trees and the roles they play in the Kasena woman's life in the community of Boania, under the topic of living and non-living things, I observed that the children knew the names of some of the trees and their uses before the Elder's teaching. In fact, some of them had seen the making of certain products like mats and shea butter at home. Activities such as the processing of shea nut into butter from the shea tree, the making of mats, the using of dry pulp from the baobab tree (*Adansonia*) to make a local meal called 'tuo zaafi' (TZ), were things the children have seen on daily basis. As a result, the children were able to understand concepts better and there was more participation, thus making concepts easier to understand because they relate to children's cultural realities. Nonetheless, IEK in ECCD also extended learning beyond the children's intellects. IEK is holistic and as a result, learning was deepened because children "holistically engage multiple elements of human capacity: mind, body, emotion, and spirit, not just the intellect" (Kimmerer, 2012, p. 320). Intellect happens to be privileged in mainstream ECCD.

5.3.4 Multiple perspectives.

The two-eyed seeing approach allowed the children to see how the two knowledge systems are taught. In other words, it fostered "intellectual pluralism in a student population largely unaware of other epistemologies" (Kimmerer, 2012, p.319), hence bridging the epistemic differences between IEK and DW-K. Martin (2012) stated that "as a concept that values both Western and Indigenous ways of thinking, two-eyed seeing embraces diverse understandings of reality" (p.32). Kimmerer (2012) concluded that the goal of introducing students to IEK also lies in "opening of their awareness to different cultural assumptions" (p. 319). Because "mutually

respectful evaluation of the divergences and convergences of these epistemologies creates the foundation for critical examination of how synergy might be created between them" (Kimmerer, 2012, p.319). I observed that the ontology and epistemology of the Kasena of Boania varied from that of the teacher and what was contained in the ECCD curricula. This was realized through the teachings of the two Elders. How the Kasena of Boania viewed and related to nature was different from what was contained in the KG2 curriculum. In the context of Canada, Wilson (2008) stated that for Indigenous People, ontologically, it is not the reality that matters but their relationship with the reality counts. There was no clear separation between the people of Boania and nature. As the male Elder noted no ceremony or activity can begin without seeking permission from the Land. Similarly, Marshall et al. (2010) commented in the context of Canada that "From an Indigenous perspective, humans are inseparable from the rest of creation" (p. 174). Based on this, Marshall, Marshall, and Iwama (2010) argued in the context of Canada that the use of Indigenous knowledge to teach reduces the distance between humans and nature. This is because "From an Indigenous perspective, humans are inseparable from the rest of creation" (Marshall, Marshall, & Iwama, 2010, p.174).

5.3.5 The methodology made the handling of conflict easier

The two-eyed seeing methodology made the handling of conflict easier. The methodology gives children the choice of their own hybridity because the two systems are explicit. Hence, they are more thoughtful in their choice of knowledge system that applies when they encounter a phenomenon. Dei (2000) concluded, "to integrate Indigenous knowledges into Western academies is to recognize that different knowledges can coexist, that different knowledges can complement each other, and also that knowledges can be in conflict at the same time" (p. 120). Therefore, conflict is inevitable once two different knowledges are brought together but it does not mean the two cannot coexist. The children showed that they could manage conflict by adopting different strategies. Different theories: Cultural Border Crossing by Aikenhead (1996), Collateral Learning by Jegede (1995), Contiguity Learning by Ogunniyi (1995), and Cognitive Border Crossing Learning Model by Fakudze (2004) have been offered (in

the context of science education) to explain how children handle knowledge conflict when Indigenous knowledge is integrated into educational programs (see Fakudze & Rollnick, 2008). Children employed different theories to handle conflicting concepts. I used the living and non-living things dichotomy to assess this by showing children pictures of a stone taught in class as a non-living thing and a stone on a shrine (with food, bloodstains, and chicken feathers on it) the children saw when the class visited the chief's palace. The children agreed with the teacher's teaching that a stone was a non-living thing. However, they also indicated that a stone on a shrine was a living thing because it was different from other stones. Pupil-9 (8-years) for example commented "that stone can talk and eat because it is a shrine stone. It always speaks to the people" (pupil-9 interview transcript, March 23rd, 2020). Similarly, pupil-2 responded, "that was a shrine stone and it is different from other stones" (pupil-2 interview transcript, March 22nd, 2020).

These two responses represent the Collateral Learning Hypothesis, a process whereby a student constructs, side by side, and with minimal interference and interaction, scientific and traditional meanings of concepts during and after a learning process (Jegede, 1995 as cited in Fakudze & Rollnick, 2008). By this, the students hold onto both belief systems that the stone is a non-living thing in the context of the classroom environmental studies and at the same time think a stone on a shrine is a living thing. I employed a second scenario on the use of the right and left hand. Among the Kasena of Boania, it is culturally disrespectful for a child to use the left hand to give or receive a gift from either a colleague or Elder. Hence, children are taught both in school and at home not to use the left hand to give or receive gifts. I asked the research participants what they would do if their teacher insisted (in the school environment) on them using the left hand instead of the right. Pupil- 9 responded that "I will use the left hand in school and the right hand at home" (pupil-9 interview transcript, March 23rd, 2020).

The response falls under the cultural border crossing hypothesis. This involves crossing borders from the subcultures associated with sociocultural environments into the subcultures of science (Aikenhead, 1996 as cited in Fakudze & Rollnick, 2008). Nonetheless, the Contiguity Learning Hypothesis by Ogunniyi (1995) is also applicable to this scenario where the two

teachings (teacher's teaching in school and traditional teaching at home) compete, supplant, or dominate one another in/after the learning process, "depending on the worldview template serving as a frame of reference in a given context" (Fakudze & Rollnick, 2008, p.88).

5.3.6 Created an opportunity for Elders to part-take in their children's education.

The two-eyed seeing methodology called into question the DW definition of a teacher. The process gave children a different perspective on who a teacher was. Owuor (2007) concluded that "the Western-based schooling system recognizes teachers' professionalism as central in facilitating the process of classroom knowledge construction" (p. 28). In this sense, the teacher is held as the epitome of knowledge, especially, in rural communities. The scholar sees this as the main reason why traditional Elders with a vast amount of knowledge are not used in the classroom. As Owuor (2007) observed, "This does not provide any space for classroom dialogue in which the experiences of members of local communities such as the role of elders can be incorporated in formal classroom knowledge construction" (p. 28). By having the Elders teach classroom concepts side-by-side with the teacher it gave the children a different view of who a teacher was. This was confirmed during one of our outdoor learning activities when one of the pupils (whose grandmother happened to be the female Elder) said "I did not know my grandmother was a teacher" (pupil-4, participant observation notes, February 3rd, 2020). The invitation of Elders into the classroom to teach IK gave the pupil of KG2 a different perspective on who a teacher was.

5.3.7 Helped decolonize ECCD.

More important to this research is that the two-eyed seeing methodology provided the framework to challenge DW-K domination of IEK in Boania Primary School, ultimately, helping decolonize ECCD. Kovach (2009) concluded "introducing Indigenous knowledges into any form of academic discourse (research or otherwise) must ethically include the influence of the colonial relationships, thereby introducing a decolonizing perspective to a critical paradigm" (p. 30). The teaching of IEK side by side with DW-K showed that there is more than one legitimate way of knowing. Akena (2012) argued that the issue of DW-K domination has to do with what is

considered legitimate knowledge. DW-K achieved the status of being the only legitimate knowledge by delegitimizing "other ways of knowing as savage, superstitious, and primitive" (Akena, 2012, p. 600). The integration of IEK into education helped students "recognise and acknowledge the existence of multiple forms of knowledge rather than one, standard, benchmark system based on western values and ways of knowing" (Kaya & Seleti, 2013, p. 37). Kovach (2009) argued that "indigenous epistemologies challenge the very core of knowledge production and purpose" (p. 28). Therefore, the Indigenous epistemologies on which the Elders drew from to teach children helped challenge the DW-K in ECCD. This was evident in the children questioning the DW definition of a teacher.

Scholars (Bowers, 2001; Gruenewald, 2003) have argued that decolonization also seeks to recover and renew sustainable traditional and non-capitalist cultural behaviors. Based on this, Gruenewald (2003) defined decolonization as the process of "unlearning much of what dominant culture and schooling teach and learning more socially just and ecologically sustainable ways of being in the world" (p. 9). By teaching children Kasena's sustainable traditional and non-capitalist IEK, I believe that the methodology helped decolonize ECE.

5.3.8 Revealed DW-K privileged position and diminished its domination over other ways of knowing.

I observed that this methodology further revealed and diminished DW-K domination over IK. Kovach (2009) argued "From a decolonizing perspective, the use of conceptual frameworks to reveal privileged epistemologies can work towards instigating change" (p. 43). By creating an avenue to teach the two knowledges side by side and not privileging one over the other, it revealed how the school system further privileges DW-K over IEK. Hence the methodology took environmental education outdoors and instead of the textbooks and teachers, the Land became the source of knowledge. None of the things taught by the Elders could be found in the children's textbooks. Once the Land became the source of knowledge, it diminished DW-K's control over the knowledge taught. For example, the Elders' holistic way of teaching concepts made the children realize forms of knowledge were not divided, because there was no separation between religion and the environment or people and nature.

5.4 Conclusion

This chapter showed that the integration of IEK into ECCD can challenge IEK's continuous domination by DW-K in Ghana. Also, several other benefits emerge when Indigenous knowledges are integrated into ECCD. For example, by integrating IEK into ECCD, it emerged that not only does IEK connect children more to nature but it also decolonizes ECCD by challenging what is taught as legitimate knowledge in the curriculum.

I believe that the methodology adopted to integrate Indigenous content into ECCD must be considered for Ghanaian schools because two different knowledges are brought together. Coupled with the danger of power dominance, it is best to adopt a methodology like the two-eyed seeing methodology which gives equal importance to both knowledges. In the context of Ghana, where there exists a dual knowledge base, the two-eyed seeing methodology does not only provide an opportunity for the two knowledges to be taught but also provides a framework to guide teachers' practice with the understanding that IEK and DW-K are equal.

5.5 Limitations

Because the research did not run its full course (full-term) as intended, outcomes are limited. The research was stopped due to the Covid-19 pandemic. Hence, IEK could not be integrated into the remaining environmental studies topics as shown in Table.2. Perhaps more outcomes could have emerged if the research had gone the whole term.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter comprises the conclusions and recommendations. The chapter begins by recapturing the ideas espoused in the other chapters by providing summaries of the Individual chapters and the themes discussed.

6.1 Summary of chapters

Having identified that DW-K continues to dominate and marginalize Indigenous content in ECCD, this research investigated the integration of IEK into ECCD in Boania Primary School. Similarly, due to the lack of readily available methodological frameworks for Integrating Indigenous content into ECCD in the Ghanaian context, I employed a two-eyed seeing Indigenous methodology, a methodology developed in the Canadian context. The different themes that emerged were presented in different chapters. Some of these were further developed into individual papers for publication.

The first chapter introduced the research. It examined the research gap and the overall research questions which guided the study. The methodology that was adopted was explained and described, and the study was justified.

The second chapter served as the literature review for the dissertation. The history of ECCD and the background for the study were outlined in this chapter. It examined the differences between ECCD and the Indigenous African ways of raising children. The chapter also highlighted the continuous domination of DW-K over Indigenous content in ECCD and called for the consideration of Indigenous content. However, with the increasing levels of environmental degradation in the country, the chapter argues the time has come for ECCD to incorporate IEK into programs. Cajete (1994) concluded that "Modern education and traditional education can no longer afford to remain historically and contextually separate entities" (p. 17). To integrate IEK into ECCD, the chapter proposes the use of the two-eyed seeing methodology.

Chapter three was the methodology and methods that were adopted to collect data. I also presented how data were transcribed, analyzed, and interpreted.

The fourth chapter focused on how the integration of IEK into ECEE enhances environmental learning outcomes at the early childhood level. The chapter examined the concept of IEK as a way of life with the cultural framework of love, respect, reciprocity, and responsibility towards nature. It went further to integrate Kasena's IEK into ECEE. The chapter emphasized that the integration of IEK into ECEE led to the achievement of more environmental outcomes than the current ECCD curriculum. The difference is that the ECEE curriculum emphasizes abstract memorizing of environmental concepts as compared to Indigenous ways of learning which are learned by doing, learned experientially. Thus, connecting children more to nature.

Chapter five examined the results of introducing the two-eyed seeing Indigenous methodology. When integrating IEKs into mainstream educational curricular and pedagogy, the methodology adopted is particularly important. A methodology, like the two-eyed seeing Indigenous methodology that offers equal importance to both knowledges should be adopted. Otherwise, DW-K may be privileged over IEKs. I argue that not only does a two-eyed seeing methodology provide an avenue to teach IEK and DW-K side by side, but it also provides a framework to guide practice. I noted that, currently, IEK and DW-K are not given equal importance and representation in the ECCD curriculum, calling into question what constitutes learning at the early childhood level. Cajete (1994) argued learning is "a key to our ability to survive in the environments that we create and that create us" (p. 24). Societies face different challenges and have developed different adaptation strategies. The community of Boania has developed a unique way of life and IEK that is effective in helping them exist with their environment. This relationship is based on mutual respect, reciprocity, and responsibility. Hence "Every community must integrate the learning occurring through modern education with the cultural bases of knowledge and value orientations essential to perpetuate its way of life" (Cajete, 1994, p. 17). Based on this, I argue that ECEE in Boania Primary School should be based on the community's IEK. But chapter five observed that for this integration to take place, a methodology, like the two-eyed seeing approach that creates equal opportunity for the two knowledges to co-exist should be adopted. This may eventually help correct the mistake

"whereby one particular knowledge system is elevated above another" (Kaya & Seleti, 2013, p. 37).

6.2 Conclusions

By adopting a two-eyed seeing methodology the study revealed contrasting experiences. I found out that the children could hold onto different epistemologies and apply them to different situations. On the stone, for example, they agreed that the teacher and the Elders both said true things, even though their ideas conflicted directly. The children held both concepts in their heads and applied them in different contexts – school knowledge, and community knowledge. However, this contrasts my handling of different epistemologies on our sacred crocodiles. I used to believe the crocodiles were my ancestors, and therefore not dangerous. But when I learned, in school, that crocodiles are dangerous animals, I developed a fear about getting close to them. Hence, I did not retain the idea that crocodiles were my ancestors and would respect me.

I observed that the community of Boania had limited input in the curriculum under which their children were being educated. Rather curriculum experts under the Ghana Education Service (GES) determined what knowledge should be taught in schools. ECCD curriculum is centrally controlled in Ghana. Because education is not place-based, GES, International agencies (such as UNICEF), education experts, and other stakeholders design ECCD curriculum from Accra. Sometimes, there is limited input from parents and communities such as Buru Boania. An example was the introduction of comprehensive sexual education and subsequent backlash from parents; the sexual education curriculum was removed as a result. Sadly, DW-K has been privileged over IEK. Based on this the male Elder argued this was one of the reasons why IEK is marginalized in Boania Primary school. Therefore, important knowledges (such as the pouring of libation, traditional farming practices, shea butter processing, dawadawa processing, trees not to fell for fuelwood) that children need to survive in the community are not taught under ECCD.

However, from the Elders, I observed a strong demand to incorporate more Indigenous knowledges into ECCD in Boania Primary School. This demand is in line with other scholars (see Abdulai, 2016; Adjei, 2007; Dei, 2000; 2004; Donkor et al. 2013). But there is a concern

that too much Indigenizing of education may compromise quality, lead to poor performance especially, in higher grades, and deny children of a better life (Adjei, 2007; Owu-Ewie, 2006).

This colonial thinking that DW-K alone can provide quality education and a better life for children continues to marginalize and invalidate IKs in Ghana. For instance, there is a concern that the use of mother tongue to teach in upper grades like high schools may prevent children from learning to speak and write good English language, subsequently, leading to children failing standardized test like the West African Senior School Certificate Examination which are mostly conducted in English. The concern is that, thereby, the children will eventually be denied the chance of acquiring white color jobs and better lives. The mentality that IKs and languages are incapable of providing quality education and better lives for children reflects the continuous influence of colonialism in Ghana. From the 1880s to the 1950s, Ghanaians were made to believe their Indigenous knowledges including their languages were inferior and not capable of providing quality education. As Dei and Simmons (2011) observed, "the imposition of European philosophies and theories of knowledge was accompanied by the devaluation of indigenous ways of knowing" (p.101). Memmi (1968) stated that the end of colonialism does not automatically lead to the emergence of a new man. Likewise, Kayira (2015) concluded "colonialism goes beyond territorial conquest: it affects one's epistemological stance, worldviews and perceptions" (p.106).

Therefore, concern for ability to compete for post-secondary education and high paid jobs will, thereby, limit Ghana's indigenization efforts to only mother tongue. Owu-Ewie (2006) noted that this policy in itself is not even consistent as the use of mother tongue as the medium of instruction has been stopped on certain occasions. Perhaps with the increasing uptake of decolonizing epistemologies in education, increasing realization that the current educational system does not meet local realities, increasing rates of graduate unemployment in formal (DW) education, and increasing environmental degradation in the country, efforts may go beyond mother tongue to include other aspects of IKs, like IEK.

Currently, there seems to be no genuine effort at the national level to Indigenize education in Ghana. IKs are seen as not being "able to produce a human capital capable of

meeting the challenges of modern science and technology associated with globalization" (McCarthy, 2004 as cited in Kaya & Seleti, 2013, p. 36). Adjei (2007) concluded that DW-K has become "the cultural capital by which individuals could access employment in both state and private organizations in Ghana" (p. 1048). The scholar went on to state that "I concede that because of material rewards that come with colonial education, it is quite difficult to ask local learners to abandon Western knowledge" (p. 1050). Bartlett, Marshall, and Marshall (2012) observed that IEK can only be integrated into school curricula when there is acknowledgment that we need each other. They further stated

> we believe that if participants do not or cannot acknowledge that they need each other and that they need to engage in meaningful co-learning, then an attempt to weave IK and mainstream knowledges and ways of knowing is destined to evolve into mere show, the only question being how long that might take (p. 334).

It seems there is not yet acknowledgment in Ghana that IEKs are needed to help the country in its quest towards becoming a "developed" nation. Currently, formal education in Ghana is loaded with mechanisms that favour DW-K over IKs. The way the school system is structured, forms of knowledge are being divided into different subjects in the curriculum, the abstract nature of teaching and learning compared to the relational nature of Indigenous epistemology, the lack of outdoor and experiential learning, and the way the school calendar is structured all favour DW-K. Whether deliberate or not Indigenous content continues to be marginalized and the reasons for this have been clearly stated in this research. This however is unfortunate because IEK is not static (see Nadasdy, 1999). It can adapt and provide a better life for Ghanaians without harming the environment.

I am not claiming that GES bars the use of IKs, the ECCD curriculum encourages teachers to adopt local examples and to employ informal experiences children bring from the home and community into school (Ministry of Education, 2006). Additionally, some Indigenous content such as games and stories have been added to topics (Ministry of Education, 2019). But these few examples also come from dominant Indigenous groups. The onus is on the teachers to find other Indigenous examples from their communities to add to classroom topics. But what if

the teacher does not know these? Besides, there is no framework to guide teachers in integrating these IKs into classroom practice. Teachers have been largely left on their own to figure out how they might incorporate these IKs into their teaching. Without any help from Indigenous Elders, DW-K continues to be privileged over Indigenous content. Even when little Indigenous content is included, the DW standards are used to determine what types of IKs to include in the curriculum. Therefore, the posture GES has taken regarding IKs has rendered them supplementary to DW-K in schools. This means they are not equally important to DW-K, because even if a teacher goes ahead to teach IEKs, they will not be part of the standardized test. As Dei (2000) concluded, "The exclusion of Indigenous knowledges from the academy within the Euro-American context of knowledge production leaves the space for the colonization of knowledges and cultures in local environments and contexts unchallenged" (p. 113).

For example, in the use of mother tongue in ECCD, only oral talk is in mother tongue, but writing is in English. Besides, the content taught still excludes other important aspects of Indigenous knowledge. Hence, although the mother tongue is used, DW values and subject matter still dominate ECCD curricula. Abdulai (2016), for example, concluded that although Indigenous languages are used as a medium of instruction in ECCD, few Indigenous games are used for instruction at the early childhood level because they are not part of the Ghanaian ECCD curriculum. It appears there are no genuine attempts at "fostering intellectual pluralism in a student population largely unaware of other epistemologies (Kimmerer, 2012, p.319)

Further, I identified that the lack of a methodological framework to guide education and teachers' practice is one of the major setbacks to weaving IEK into ECCD in Boania Primary School. Adopting a two-eyed methodological framework further revealed how DW-K was privileged over IEK. Kovach (2009) argued that "From a decolonizing perspective, the use of conceptual frameworks to reveal privileged epistemologies can work towards instigating change" (p. 43).

This study showed how the adoption of a two-eyed seeing methodology worked out in Boania Primary School. To the Elders, two-eyed seeing gives children a balance in life. The methodology creates a space for teachers to provide DW explanations to environmental concepts

whilst the Elders provide the Indigenous explanations. Thus, creating a balance between the two knowledge systems. Kimmerer (2012) refers to this as creating a synergy. The scholar observed a "mutually respectful evaluation of the divergences and convergences of these epistemologies creates the foundation for critical examination of how synergy might be created between them" (Kimmerer, 2012, n.p). For example, the teaching of the two knowledges concurrently creates a spiritual and cognitive balance. Among the Kasena's there is no difference between environmental knowledge and spiritual knowledge. Hence, to honour the gods is to honour the environment. Also, economically two-eyed seeing provides a balance and security, if the children fail at DW education, they can fall back on Indigenous activities such as shea butter processing, dawadawa processing among others to make a living.

To the teacher however, the two-eyed seeing methodology provides a framework to teach IEK. For example, the adoption of the methodology reduces the bureaucracy that gets in the way of integrating IEK into the classroom. She lists specifically, for the bureaucracy, teachers are not taught how to teach IEK, the headmistress would have to permit the Elder to come to the classroom, there would be no funds to pay the Elder to visit, and that the Elder's teachings would not match the exam. She also noted how inviting Elders into the classroom might be negatively perceived by her peers. Hence, the adoption of a two-eyed seeing framework helped address these issues.

I hope the adoption of a two-eyed seeing methodological framework and the subsequent revelation of how it worked out in Boania Primary School may lead to change in how we consider IK in formal education.

With the increasing levels of environmental degradation in the country, the time has come for Ghana to have a critical look at the model of ECCD practiced, especially, when it comes to integrating EE into ECCD. Currently, EE is not doing much in making children environmentally conscious. Perhaps this explains why the school is littered with plastic waste whilst environmental education is taught. Ganaa (2011) observed this was a national issue and not limited to Boania Primary School alone. This means EE is being received as abstract knowledge to pass exams and does not transform students' lives. Nadadsy (1999) also attributes

this to the compartmentalization of knowledge which affects how people receive knowledge. In this case, the children receive EE as knowledge separate from the environment. In other words, EE is seen as knowledge to be received and not to be lived. IEK, on the other hand, has the potential to help achieve sustainability in Ghana. This is especially seen at the early childhood level where developing a positive attitude towards nature is the main goal. Since IEK is a way of life and not knowledge to be received in the classroom, it involves love, respect, reciprocity, and responsibility towards the environment.

6.3 Recommendation

Hagglund and Samuelsson (2009) stated that little attention has been paid to the way early childhood education should be involved in sustainability. Ghana as a country will need to re-examine its model of ECCD as practiced and the place of IEKs, if there is desire to solve the current environmental problems the country is facing. Mazuri (1986) concluded that Africa can never go back completely to its pre-colonial starting point but there may be a case for at least a partial retreat, a case for re-establishing contacts with familiar landmarks of yesterday and then re-starting the journey of modernization under Indigenous impetus. Given the rate at which environmental degradation is occurring, Ghana may need to look back to traditional ways of life, to IEKs that connect children to nature and enhance sustainability outcomes. There lies the country's hope of connecting people to nature. This can be done by weaving IEK into ECEE. Environmental sustainability in Ghana cannot be achieved without considering IEKs.

As shown so far, relying on DW-K alone has not been able to solve the country's environmental problems. According to the World Bank report (2006), coastal towns are facing severe water shortages, wildlife populations and biodiversity are in serious decline, health-related problems associated with indoor and outdoor air pollution are increasing, and water and sanitation issues have emerged as serious health threats for most of the planet's population. Ghana ranked 109 out of 163 countries in terms of environmental sustainability in a survey conducted by Yale University in 2010 (Ministry of Environment Science and Technology, 2012). Kimmerer (2012) concluded, "TEK has a legitimate place in the education of the next generation of environmental scientists" (n.p). Drawing on these experts would help solve these

environmental problems in Ghana. Besides, there needs to be "reawakening and healing the relationship between people and the Land" (Kimmerer, 2012, p. 318). Reviving IEKs is, perhaps, the country's last hope if a mutual relationship with nature is to be restored.

Integrating IEKs into ECCD also helps decolonize the program by challenging DW-K as the only legitimate knowledge. The question of integrating Indigenous content into ECCD, according to Pence and Shafer (2006), is based on philosophical and ethical to utilitarian and pragmatic reasons. Of the philosophical and ethical reasons, the scholars noted that there is an intrinsic value in cultural diversity, hence the need to promote tolerance or celebration of different worldviews and philosophical systems. Besides, IKs, with their cultural framework of love, respect, responsibility, provide an alternative to the dominant economic and moral system of the DW, which has been blamed for damaging the planet and compromising the survival and quality of life of future generations (Pence & Shafer, 2006; Ritchie, 2012). Having IKs taught side by side with DW-K, would make Ghanaians appreciate that Indigenous ways of knowing are equally important.

For pragmatic reasons, Pence and Shafer (2006) stated that IKs have proven themselves in helping people survive and evolve in their specific context for years. As another reason for maintaining IEK, Kimmerer (2002) concluded that "the complex issues of environmental sustainability require a diversity of intellectual approaches and can benefit from a thoughtful consideration and incorporation of traditional ecological knowledge" (p.434). In this study, I discovered IEKs are playing a significant role in helping communities effectively mitigate environmental challenges in the country. In the context of Ghana, research has empirically demonstrated the success of IEK in addressing current environmental challenges (Adom, 2018; Boafo et al. 2016; McPherson et al., 2016). Examples can be found in rural communities across Ghana, on how IEK is helping communities withstand environmental challenges. The question, therefore, is why is this knowledge not taught in schools? Based, on these arguments, I recommend that IEK be considered in ECCD.

Knowledge domination is an important issue that must be considered when integrating Indigenous content into education in Ghana. Especially given the privileged position already

occupied by DW-Ks and how the school system is structured, care must be taken when integrating IEK into ECCD. Otherwise, DW-Ks may be privileged over IEK. Hence a methodological framework, like the two-eyed seeing that creates equal respect for both knowledges is needed. This methodology should guide all levels of education including teacher training programs. As Asare and Nti (2014) observed, "It is not uncommon to hear people assert that teachers teach the way they were taught to become teachers" (p. 2). This can be done by integrating two-eyed seeing into the curriculum and pedagogy of pre-service and in-service teacher training programs.

Again, if IEKs are to be integrated into ECCD there is the need to decentralize education in Ghana and this can also be done by adopting place-based learning principles. One of the reasons why IEK is marginalized in Boania Primary School is curriculum is not place-based. There has been a shift in "control over learning from children, families, and communities to ever more centralised systems of authority" (Kaya & Seleti, 2013, p. 37). Hence local knowledges and environmental challenges do not inform curriculum design. Importantly, this must also extend to include Land-based education principles. It involves acknowledging the Land and its inhabitants as the source of knowledge and not just curriculum. This means outdoor learning should be prioritized in Ghana's ECCD. All learning must be done on the Land as the source of knowledge. This will ultimately lead to questioning what it means to learn in early childhood and what the outcomes are. Integrating IEK into ECCD means recognizing that learning in children extends beyond intellect. Learning is holistic, involving the "mind, body, emotion, and spirit, not just the intellect" (Kimmerer, 2012, p. 320).

The future of ECEE in Ghana lies in its ability to incorporate IKs, especially IEKs. I observed that when ECEE incorporates IEKs, environmental outcomes are achieved more. To suit IEKs, environmental lessons are moved outdoors, hence making lessons practical and experiential while allowing children to connect more with nature. Also, IEK has the potential "for broadening and deepening the teaching of environmental science" (Kimmerer, 2012, p. 318). Further, I recommend that besides the sciences, IEK be integrated into other subjects. Perhaps, this will allow us to begin to define IEK outside DW scientific terms (Huntington,

2000). But in line with Kimmerer's (2012) suggestion, there will need to be a rigorous examination of DW-K and IEKs. This will allow "students begin to grasp the boundaries of each, the nature of the inquiry approach and the lens through which results are interpreted" (Kimmerer, 2012, p.320). Moving forward, the ECEE curriculum and pedagogy will need to find ways to Indigenize.

REFERENCES

Abah, J., Mashebe, P. & Denuga, D.D. (2015). Prospect of integrating African Indigenous Knowledge systems into the teaching of sciences in Africa. *American Journal of Educational Research, 3*(6), 668-673. Doi: 10.12691/education-3-6-1.

Abdi, A. A., & Cleghorn, A. (Eds.). (2005). *Issues in African education: Sociological perspectives.* New York: Palgrave MacMillan.

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.

Abdulai, A. (2017). Activities at early childhood centers in Ghana: Observations of early childhood teacher-trainees. *Asian Journal of Education and Training, 3*(1), 74-81.

Aboagye, K., & Quist, F. (2000). *Study notes on education and culture.* Department of Psychology and Education. University College of Education, Winniba, Ghana.

Aboagye, J.K. (1997). *The school curriculum, social change and national development*. EDC 121. Revised Edition. Department of Psychology & Education, UCEW, Unpublished manuscript.

Abrompah, W.K. (2010). *Rudiments of curriculum construction and social change*. Winneba: Watered Gardens Press.

Acharibasam, J.B., & McVittie, J. (2020). Tensions between western ECCD and the Indigenous African educational system and what this means for ECCD practice. *Journal of Education and Practice, 11*(24). Doi: 10.7176/JEP/11-24-13.

Acemoglu, D., Johnson S., & Robinson J.A. (2001). The colonial origins of comparative development: An empirical investigation. *The American Economic Review*, *91*(5), 1369-1401.

Acquah, I. (1958). *Accra survey.* London: University of London Press, LTD.

Adams, S., Adom, K. & Klobodu, E.K.M. (2016). Urbanization, regime type and durability, and environmental degradation in Ghana. *Environ Sci Pollut Res, 23,* 23825–23839. Doi 10.1007/s11356-016-7513-4.

Adeyemi, M. B., & Adeyinka, A. A. (2002). Some key issues in African traditional education. *McGill Journal of Education, 37*, 223-240.

Adom, D. (2018). Traditional cosmology and nature conservation at the Bomfobiri wildlife sanctuary of Ghana. *Nature Conservation Research, 3*(1), 35-57. Doi: 10.24189/ncr.2018.005.

Adjei, P. B. (2007). Decolonizing knowledge production: The pedagogic relevance of Gandhian Satyagraha to schooling and education in Ghana. *Canadian Journal of Education, 30*(4), 1046-1067.

Adu-Agyem, J. & Osei-Poku, P. (2012). Quality education in Ghana: The way forward. *International Journal of Innovative Research & Development, 1*(9), 164-177.

Adu-Gyamfi, J. (2014). Childhood construction and its implications for children's participation in Ghana. *African Journal of Social Sciences, 4*(2), 1-11. Doi.org/10.15640/jehd.v5n3a17.

Agbenyega, J. (2008). Development of early years policy and practice in Ghana: Can outcomes be improved for marginalized children? *Contemporary Issues in Early Childhood, 9*(4), 400-404.

Agyeman, J. (2002). Culturing environmental education: From First Nation to frustration. *Canadian Journal of Environmental Education, 7*(1), 2-12.

Aidoo, A. A. (2008). Positioning ECD nationally: Trends in selected African countries. In M. Garcia, A. Pence, & J.L. Evans (Eds.). *Africa's future, Africa's challenge early childhood care and development in Sub-Saharan Africa* (pp. 29-48). Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Aikenhead G. (1996). Science education: Border crossing into the sub-culture of science. *Studies in Science Education,* 27, 1-57.

Aikenhead, G., & Ogawa, M. (2007). Indigenous knowledge and science revisited. *Cultural Studies of Science Education, 2,* 539–620.

Aizenman, N., & Warner, G. (2018, June 19). What we can learn from Ghana's obsession with preschool [Radio Broadcast]. National Public Radio. Retrieved from

https://www.npr.org/sections/goatsandsoda/2018/06/19/613655788/when-it-comes-to-preschool-does-fatherreally-know-best. October 10 2018.

Akena, F. A. (2012). Critical analysis of the production of western knowledge and its implications for Indigenous knowledge and decolonization. *Journal of Black Studies, 43* (6), 599-619.

Aketema, J. (2017). The representation of the Kasena culture through Kasem language films (Masters dissertation). Retrieved from; http://ugspace.ug.edu.gh/bitstream/handle/123456789/23573/The%20Representation%20of%20the%20Kasena%20Culture%20through%20Kasem%20Language%20Films.pdf?sequence=1&isAllowed=y. April 12, 2020.

Antwi, M.K. (1992). *Education, society and development in Ghana*. Accra: Unimax Publishers Ltd.

Arnold, C. (2004). Positioning ECCD in the 21stCentury. In E. Hanssen & L. Zimanyi (Eds.), *Positioning ECCD. Coordinators' notebook: An International resource for early childhood development* Number 28. Consultative Group on Early Childhood Care and Development. Toronto Canada.

Arseven, A. (2014). The Reggio Emilia approach and curriculum development process. *International Journal of Academic Research Part B, 6*(1), 166-171. Doi: 10.7813/2075-4124.2014/6-1/B.23.

Arhin, S. (2008). Complementing legislation: The role of cultural practices in the conservation of wild-life- examples from Ghana. *Journal of Animal Law,* (4), *93–98.*

Ärlemalm–Hagsér, E. (2013). Respect for nature: A prescription for developing environmental awareness in preschool. *Center for Educational Policy Studies Journal, 3*(1), 25-44.

Asante, F. (2017). Environmental education integrated in school syllabi. Retrieved from http://ghana.gov.gh/index.php/media-center/news/469-environmental-education-integrated-in-school-syllabi. March 29th 2017.

Asare, K. (2015). Exploring the kindergarten teachers' assessment practices in Ghana. *Developing Country Studies, 5*(8), 110-128.

Asare, K.B., & Nti, S.K. (2014). Teacher education in Ghana: A contemporary synopsis and matters. *Sage Open*, 1–8. Doi:10.1177/2158244014529781

Ashcroft, B. (2017). *Postcolonial theory*. John Wiley & Sons Ltd.

Attuquayefio, D. K., & Gyampoh, S. (2010). The Boabeng-Fiema Monkey Sanctuary, Ghana: A case for blending traditional and introduced wildlife conservation systems. West *African Journal of Applied Ecology, 17*, 1-9.

Atuguba, J. A. (2018). Environmental education in colleges of education in Ghana: Experiences and perceptions of environmental educator (Unpublished Doctoral thesis) University of Birmingham. Retrieved from https:/etheses.bham.ac.uk/id/eprint/9462/7/Atuguba2019PhD_Redacted.pdf. August 13, 2020

Aubel, J. (2010). Elders: A cultural resource for promoting sustainable development. In *2010 State of the World Report: Transforming Cutlure, pp. 41-46.* The World Watch Institute.

Awedoba, A.K. (2000). *An introduction to Kasena society and culture through their proverbs*. New York: University Press of America.

Ball, J. (2010). Culture and early childhood education. *Encyclopedia on early childhood development*. Retrieved from; http://www.child encyclopedia.com/culture/accordingexperts/culture-and-early-childhood-education November 27, 2018.

Bailey, J. (2008). First steps in qualitative data analysis: Transcribing. *Family Practice,* 25, 127–131.

Barratt Hacking, E., Barratt, R., & Scott, W. (2007). Engaging children: Research issues around participation and environmental learning. *Environmental Education Research, 13*(4), 529-544. Doi:10.1080/13504620701600271.

Bartlett, C., Marshall, M., & Marshall, A. (2012). Two-eyed seeing and other lessons learned within a co-learning journey of bringing together Indigenous and mainstream knowledges and ways of knowing. *Journal of Environmental Studies and Sciences, 3,* 331-340. Doi 10.1007/s13412-012-0086-8

Battiste, M. (2002). Indigenous knowledge and pedagogy in First Nations education: A literature review with recommendations. Prepared for the National Working Group on Education and the Minister of India Affairs, Indian and Northern Affairs Canada (INAC) Ottawa ON [Online]. Retrieved from http://www.afn.ca/uploads/files/education/24._2002_oct_marie_battiste_indigenousknowledgeandpedagogy_lit_review_for_min_working_group.pdf. November 20th, 2018.

Battiste, M. (2000). Introduction: Unfolding the lessons of colonization. In M. Battiste (Ed.), *Reclaiming Indigenous voice and vision* (pp. xvi–xxx). Vancouver: UBC Press.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544-559.

Bazeley, P., & Jackson, K. (2013). *Qualitative Data Analysis with NVivo*. London: Sage Publication.

Berman, D. S., & Davis-Berman, J. (2000). Therapeutic uses of outdoor education. *ERIC Digest*, 1-9.

Becker, G. (1964). *Human capital: Theoretical and empirical analysis*. University of Chicago Press.

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, *10*(5), 1251-1262.

Bhabha, H. (1985). Signs taken for wonders: Questions of ambivalence and authority under a tree outside Delhi, May 1817. *Critical Inquiry*, *12*, 144-165.

Bhagwanji, Y. (2011). Early childhood environmental education rating scale: A formative evaluation tool to help programs improve nature education for young children. Retrieved from https://cdn.naaee.org/sites/default/files/earlychildhoodratingscale.pdf. May 7th, 2020.

Bilton, H. (2002). *Outdoor play in the early years.* London: David Fulton.

Boakye-Boateng, A. (2010). Changes in the concept of childhood: Implications on children in Ghana. *The Journal of International Social Research*, *3*(10), 104-115.

Boakye, J.K.A., Etse, S., Adamu-Issah, M., Moti, M.D., Matjila, J.L., & Shikwambi, S.J. (2008). ECD Policy: A Comparative Analysis in Ghana, Mauritius, and Namibia. In M.A. Garcia, A. Pence & J.L. Evans. (Eds.). *Africa's Future, Africa's Challenge Early Childhood Care and Development in Sub-Saharan Africa* (pp.169- 185). Washington DC: The International Bank for Reconstruction and Development / The World Bank .

Boafo, Y.A., Saito, O., Kato, S., Kamiyama, C., Takeuchi, K., & Nakahara, M. (2016). The role of traditional ecological knowledge in ecosystem services management: The case of four rural communities in Northern Ghana. *International Journal of Biodiversity Science, Ecosystem Services & Management, 12*(1–2), 24–38. Doi.org/10.1080/21513732.2015.1124454

Boafo, H.A., Affedzie-Obresi S., Gbemavo, D.S.J.C., Clottey, V.A., Nkegbe, E., Adu-Aboagye, G., & Kenis, M. (2019) Use of termites by farmers as poultry feed in Ghana. *Insects, 10*(69), 1–13

Boateng, F. (1983). African traditional education: A method of disseminating cultural values *Journal of Black Studies, 13*(3), 321-336.

Bohensky, E. & Maru, Y. (2011). Indigenous Knowledge, science, and resilience: What have we learned from a decade of international literature on "integration"? *Ecology and Society, 16*(4), 6. Doi: 10.5751/ES-04342-160406.

Boileau. E.Y.S. (2013). Young voices: The challenges and opportunities that arise in early childhood environmental education research. *Canadian Journal of Environmental Education, 18*, 142-154.

Bowers, C. A. (2001). *Educating for Ecojustice and Community.* Athens: The University of Georgia Press.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77–101. doi:10.1191/ 1478088706qp063oa

Brock-Utne, B. (2001). Indigenous conflict resolution in Africa. Retrieved from https://www.researchgate.net/profile/Birgit-Brock-Utne-

2/publication/238729189_Indigenous_conflict_resolution_in_Africa/links/549421a40cf2e1b6095f9a3f/Indigenous-conflict-resolution-in-Africa.pdf. June 17th, 2021.

Bruchac, M. (2014). Indigenous knowledge and traditional knowledge. In C. Smith (Ed.), *Encyclopedia of Global Archaeology* (pp.3814-3824). New York: Springer.

Burdette, H. L., & Whitaker, R. C. (2005). Resurrecting free play in young children. Looking beyond fitness and fatness to attention, affiliation, and affect. *Archives of Pediatrics & Adolescent Medicine, 159* (1), 46.

Cajete, G. (1994). *Look to the mountain: An ecology of Indigenous education*. Durango, CO: Kivaki Press.

Cajete, G. (1999). The Native American learner and bicultural science education. In K. Swisher & J. Tippeconnic (Eds.), *Next steps: Research and practice to advance Indian education*.

Cajete, G. (2004). *Philosophy of native science.* In A. Waters (Ed.), *American Indian thought: Philosophical essays* (pp.45–57). Oxford: Blackwell.

Campbell-Barr, V., & Nygård, M. (2014). Losing sight of the child? Human capital theory and its role for early childhood education and care policies in Finland and England since the Mid-1990s. *Contemporary Issues in Early Childhood*, 15, 14. doi:10.2304/ciec.2014.15.4.346

Cassell, C., & Symon G. (Eds.). (2004). *Essential guide to qualitative methods in organizational research.* London : Sage Publications.

Casely-Hayford, L., Palmer, R. Ayamdoo, C., & Thompson, N.M. (2007). *Aid and donor partnerships' in Ghana's education sector, 1987-2007: A critical review of the literature and progress.* Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.521.1426&rep=rep1&type=pdf. August 29, 2019.

Castellano, M. B. (2004). Ethics of Aboriginal research. *Journal of Aboriginal Health, 1,* 98–114.

Chinn, P.W.U. (2007). Decolonizing methodologies and Indigenous knowledge: The role of culture, place and personal experience in professional development. *Journal of Research in Science Teaching, 44*, 1247 – 1268.

Cole, M., Hakkarainen, P., & Bredikyte, M. (2010). Culture and early childhood learning. *Encyclopedia on Early Childhood Development* [online]. Retrieved from http://www.child-encyclopedia.com/sites/default/files/textes-experts/en/601/culture-and-early-childhood-learning.pdf. December 13th 2018.

Creswell, J.W. & Poth, C.N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc. Kindle version.

Cutter-Mackenzie, A., & Edwards, S. (2013). Toward a model for early childhood environmental education: Foregrounding, developing, and connecting knowledge through play-based learning. *The Journal of Environmental Education, 44*(3), 195–213,

Dahlberg, G., & Moss, P. (2005). *Ethics and politics in early childhood education*. New York: Routledge Falmer.

Darko I. N. (2014). Environmental stewardship and Indigenous education in Africa: Looking beyond Eurocentric dominated curricula. In G.J.S. Dei, & P.B. Adjei (Eds.) *Emerging Perspectives on 'African Development': Speaking Differently* (pp. 179-206). Peter Lang Inc.Doi.org/10.3726/978-1-4539-1306-2.

Datta, R. (2015). A relational theoretical framework and meanings of land, nature, and sustainability for research with Indigenous communities. Local Environment. *The International Journal of Justice and Sustainability, 20*(1), 102–113.

Davis, W. (2003, February). *Dreams from endangered cultures* [video file]. TED conference. https://www.ted.com/talks/wade_davis_dreams_from_endangered_cultures#t-635080.

Delvaux, C., Sinsin, B., Darchambeau, F. & Van Damme, P. (2009). Recovery from bark harvesting of 12 medicinal tree species in Benin, West Africa. *Journal of Applied Ecology, 46,* 703–712 doi: 10.1111/j.1365-2664.2009.01639.x.

Dei, G.J.S. (2000). Rethinking the role of Indigenous knowledges in the academy. *International Journal of Inclusive Education, 4*(2), 111-132. doi:10.1080/136031100284849.

Dei, G.J. S., Hall, B. L., & Rosenberg, D.G. (2002). *Indigenous knowledges in global contexts: Multiple readings of our world.* Toronto: University of Toronto Press.

Dei, G.J.S. (2004). *Schooling and education in Africa: The case of Ghana.* Trenton, NJ: Africa World Press, Inc.

Dei, G. J. S. (2011). Education and socialization in Ghana. *Creative Education, 02*(02), 96-105.

Dei, G. J. S. & Simmons, M. (2011). Indigenous knowledge and the challenge for rethinking conventional educational philosophy: A Ghanaian case study. In *Counterpoints, 352, Regenerating the Philosophy of Education: What Happened to Soul?* pp. 97-111. New York: Peter Lang.

Dei, G.J.S. (2013). Critical perspectives on Indigenous research. *The Journal of the Society for Socialist Studies / Revue de la Société d'études socialistes,* 9(1), 27-38.

Dei G.J.S. (2015, September). łàà Katì to advance the understanding and uses of Traditional Knowledge. [video file]. TED conference. https://www.youtube.com/watch?v=DvQxDS7hEMg

Dewey, J. (1938). *Experience and education.* New York: Collier Book

Docherty, S., & Sandelowski, M. (1999). Focus on qualitative methods: Interviewing children. *Research in Nursing and Health,* 22, 177–185.

Doghle K., King, R.S., and Akaabre, P.B. (2018). Legal establishments and gendered access to land in patriarchal societies of north-western Ghana. *African Journal of Land Policy and Geospatial Sciences*, (2), 77-99. ISSN2657-2664,

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.

Drawson, A.S., Toombs, E., & Mushquash, C.J. (2017). Indigenous research methods: A systematic review. *The International Indigenous Policy Journal, 8*(2). https://ojs.lib.uwo.ca/index.php/iipj/article/view/7515/6159

Dwyer, S. C. & Buckle J.L. (2009). The space between: On being an insider-outsider in qualitative research. *International Journal of Qualitative Methods, 8*(1), 54-63.

Edwards, C., Gandini, L., & Forman, G. (1993). *The hundred languages of children: The Reggio Emilia approach to early childhood education*. Norwood, NJ: Ablex.

Elvstam, A., & Fleischer, S. (2018). Ghanaian teacher students' view on using outdoor pedagogy when teaching natural science (Degree Project). Retrieved from https://pdfs.semanticscholar.org/74ce/fe7338e729a9acc80bc889c91bdbfe2debe7.pdf. August 3, 2020.

Eshun, G. (2011). Building bridges in tourism and hospitality research in Africa: A postcolonial methodological contribution. Retrieved from file:///C:/Users/Gale/Downloads/CONF-SPMET.pdf. October 11, 2018.

Etikan I., Musa S. A., & Alkassim R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4. doi: 10.11648/j.ajtas.20160501.11

Fafunwa, B. (1991). *History of education in Nigeria.* Ibadan, Nigeria: NPS Pub.

Fakudze, C.G. (2004). Learning of science concepts within a traditional socio-cultural environment. *South African Journal of Education*, *24*(4), 270–277.

Fakudze, C., & Rollnick, M. (2008). Language, culture, ontological assumptions, epistemological beliefs, and knowledge about Nature and naturally occurring events: Southern African perspective. L1. *Educational Studies in Language and Literature*,*8*(1), 69-94.

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods, 5*(1), 80–92. Retrieved from; http://www.ualberta.ca/~iiqm/backissues/5_1/pdf/fereday.pdf. December 13th, 2018.

France, H. (1997). First Nations: Helping and learning in the Aboriginal community. *Guidance and Counseling, 12(2), 3-8.*

Fien, J. (1995). Teaching for a sustainable world: The environmental and developmental education project for teacher education. *Environmental Education Research, 1*(1), 21-34.

Flick, U. (Ed.). (2014). *The sage handbook of qualitative data analysis.* London: SAGE Publications Ltd;

Fung, C.K.H. (2015). "Active child" and "active teacher": Complementary roles in sustaining child-centered curriculum, childhood education, *91*(6), 420-431. Doi: 10.1080/00094056.2015.1114787

Ganaa, E. F. (2011). Environmental education in senior high schools: The case of northern region of Ghana. (Master's thesis). Retrieved from https://dlc.library.columbia.edu/catalog/ldpd:495860/bytestreams/content/content?. October 22, 2018

Garcia, M., Pence, A., & Evans J.L. (Eds.). (2008). *Africa's future, Africa's challenge early childhood care and development in Sub-Saharan Africa*. Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Gelman, R., & Brenneman, K. (2004). Science learning pathways for young children. *Early Childhood Research Quarterly*, *19*, 150–158. Doi:10.1016/j.ecresq.2004.01.009

Gergen, K. J. (1992). Toward a postmodern psychology. In S. Kvale (Ed.). *Psychology and postmodernism* (pp. 17–30). London: Sage.

Ghana Statistical Service. (2014). 2010 Population & housing census report. District analytical report. Kansena Nankana West District. Retrieved from http://www2.statsghana.gov.gh/docfiles/2010_District_Report/Upper%20East/Kasena%20Nankana%20West.pdf. April 12th, 2020

Ghana National Environmental Policy (2012). Retrieved from https://new-ndpc-static1.s3.amazonaws.com/CACHES/PUBLICATIONS/2016/04/16/NATIONAL_Environmental Policy.pdf. January 4th, 2020

Gitau, S. K. (2000). *The environmental crisis: A challenge for African Christianity*. Nairobi: Acton Publishers.

Githiru, M. (2007). Conservation in Africa: But for whom?. *FFI, Oryx*, *41*(2), 119–120. Doi:10.1017/S0030605307001937

Glasser, R. (1991). The maturing of the relationship between the science-of learning and cognition and educational practice. *Learning and Instruction, 1*, 129-144.

Global Environmental Education Partnership [GEEP]. (2019). *Ghana*. Retrieved from https://thegeep.org/learn/countries/ghana. October 12th, 2019.

Graham, C.K. (1971). *The history of education in Ghana. From the earliest times to the declaration of independence.* London: Frank Cass & Co. Ltd.

Gregoire, H., & Lebner, A. (2001). Re-evaluating relevance: Intellectual property rights and women's traditional environmental knowledge. Retrieved from http://www.earthsummit2002.org/wcaucus/CaucusPositionPapers/tek.html. November 16th, 2018.

Greenwood, M., de Leeuw, S., Lindsay, N.M., & Reading, C. (2015). *Determinants of Indigenous Peoples' health in Canada: Beyond the social*. Toronto: Canadian Scholars Press.

Gruenewald, D.A. (2003). The best of both worlds: A critical pedagogy of place. *Educational Researcher, 32*(4), 3-12.

Gyekye, K. (1996). *African cultural values: An introduction*. Philadelphia and Accra: Sankofa Publishing Company.

Hagglund, S., & Samuelsson, I. P. (2009). Early childhood education and learning for sustainable development and citizenship. *International Journal of Early Childhood*, *41*(2), 49.

Hanna, R., & Oliva, P. (2016). Implications of climate change for children in developing countries. *The Future of Children, 26*(1), 115-132.

Hatcher, A., Bartlett, C.M., Marshall, A., Marshall, M. (2009). Two-eyed seeing in the classroom environment: Concepts, approaches and challenges. *Canadian Journal of Science, Mathematics and Technology Education, 9*(3)141–153. Doi: 10.1080/14926150903118342

Hart, M.A. (2010). Indigenous worldviews, knowledge, and research: The development of an Indigenous research paradigm. *Journal of Indigenous Voices in Social Work, 1*, 1–16

Hartig T., Mitchell R., de Vries S., & Frumkin H. (2014). Health and nature. *Annual Reviews*, *35*(1).

Hens L. (2006). Indigenous knowledge and biodiversity conservation and management in Ghana. *J. Hum. Ecol.*. *20*(1), 21-30

Herzog, J. D. (2008). Situated learning and compagnonnage formation: Implications for the education systems of poor (and rich) nations. In P.R. Dasen & A. Akkari (Eds.). *Educational theories and practices from the Majority World* (pp. 98-122). New Delhi, India: Sage.

Hunter, S., & Brisbin, R.A. Jr. (2016). Pet politics: The political and legal lives of cats, dogs, and horses in Canada and the United States (New Directions in the Human Animal Bond), West Lafayette, IN: Purdue University Press.

Hunter, A. (2002). Introduction to the circumpolar world: Contents traditional and Western systems of knowledge. (Unpublished thesis). Rovaniemi: University of the Arctic. Retrieved from http://www.Uarctic.org/ bcs100_m10_0ADKF.Pdf.File. December 28th 2018.

Huntington H. (2000). Using traditional ecological knowledge in science: Methods and applications. *Ecological Application*, *5*(10), 1270-1274.

Hurworth, R. (2012). Techniques to assist with interviewing. In J. Arthur, M. Waring, R. Coe, & L. Hedges (Eds.), *Research methods and methodologies in education* (pp.177–185). Los Angeles, CA: Sage.

Hyde, K.A.L., & Kabiru, M.N. (2003). *Early childhood development as an important strategy to improve learning outcomes.* Working Group on Early Childhood Development. Association for the Development of Education in Africa, Quality Study.

Ikyoive, T. (2017). Ancestors, Elders and power in traditional African societies: Ogunyemi's the vow and the question of suicide. *Africology. The Journal of Pan African Studies, 10*(7).

Iwama, M., Marshall, A., Marshall, M., & Bartlett, C. (2009). Two-eyed seeing and the language of healing in community-based research. *Canadian Journal of Native Education, 32*, 3–23.

Jahoda, G. (1961). *White man: A study of the attitudes of Africans to Europeans in Ghana before independence.* London: Oxford University Press.

Jegede O.J. (1995). Collateral learning and the eco-cultural paradigm in science and mathematics education in Africa. *Studies in Science Education*, *25,* 97-137.

Jegede, O. (1994). African cultural perspective and the teaching of science. In J. Solomon & G. Aikenhead (Eds.). *STS education: International perspectives on reform* (pp. 120-130). New York: Teachers College Press.

Kapyrka, J., & Dockstator, M. (2012). Indigenous knowledges and western knowledges in environmental education: Acknowledging the tensions for the benefits of a "two-worlds" approach. *Canadian Journal of Environmental Education, 17*, 97–112.

Kanu, Y. (2007). Tradition and educational reconstruction in Africa in post-colonial and global times: The case of Sierra Leone. *African Studies Quarterly*, *9*, 187-204.

Kariuki, F. (2015). Conflict resolution by elders in Africa: Successes, challenges and opportunities. Retrieved from https://d1wqtxts1xzle7.cloudfront.net/53846688/francis-kariuki.pdf?1499942743=&response-content-disposition=inline%3B+filename%3DConflict_Resolution_by_Elders_in_Africa.pdf&Expires=1623983858&Signature=PoVNLn5FUItBXG-S88apDfdwCTv21UA35sTRk6WBFdmMP6gMFShXO3dQiicS0oTZ8UaO-rNCKhYZkSejB6XRQBYxCYIWjyy5VWa9bOJ3JINhvsoK~tjYUhzQ8G1NTDdKLM~lpa~1wZxrVNgKBLkBoo~GfxgDl~B7mt7Kyut7Y-S-nK2udcx2JI1Zm1fYkPpbDLhqhlyjO6coQjhn-CfDYIVWD03mdVspskQ-tVAfLc1uf5zS5BTPomf~4CqU3t8FFgF6kvBCJ8peOcRsgHr41oZqx79cLwh5rriQOzNMJ8JdzuEnVAKZpdZ2KoBA--Fa3QflutvNmI5cHYaIVeB-fw__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA. June 17th, 2021

Kawulich, B. (2012). Collecting data through observation. In C. Wagner, B. Kawulich, & M. Garner (Eds.), *Doing Social Research: A global context* (pp.150-16). McGraw Hill.

Kaya, H.O. & Seleti, Y.N. (2013). African Indigenous Knowledge systems and relevance of higher education in South Africa. *The International Education Journal: Comparative Perspectives, 12*(1), 30–44.

Kayira, J. (2015). (Re)creating spaces for uMunthu: Postcolonial theory and environmental education in southern Africa. *Environmental Education Research, 21*(1), 106–128.

Kazaresam, E.A. (1975). *The Kasena of Ghana and pastoral approach*. Licence en catechese et pastorale. Bruxelles: Lumen Vitae International Institute of Catechetics and Pastoral.

Kessey, K.D. & Arko, B. (2013). Small scale gold mining and environmental degradation, in Ghana: Issues of mining policy implementation and challenges. *Journal of Studies in Social Sciences, 5*(1), 12-30.

Khupe, C., & Keane, M. (2017). Towards an African education research methodology: Decolonising new knowledge. *Educational Research for Social Change, 6*(1), 25-37.Doi.org/10.17159/2221-4070/2017/v6i1a3

Kovach, M. (2009). *Indigenous methodologies, characteristics, conversations, and context*. Toronto: Toronto University Press.

Kovach, M. (2010). Conversational method in Indigenous research. *First Peoples Child & Family Review*, *5*(1), 40–48.

Kim, E.A., & Dionne, L. (2014). Traditional ecological knowledge in science education and its integration in Grades 7 and 8 Canadian science curriculum documents. *Canadian Journal of Science, Mathematics and Technology Education*,*14*(4), 311–329. Doi:10.1080/14926156.2014.970906

Kim, E.A., Asghar, A., & Jordan, S. (2017). A critical review of traditional ecological knowledge (TEK) in science education. *Canadian Journal of Science, Mathematics and Technology Education*, 17, 258-270. Doi: 10.1080/14926156.2017.1380866.

Kimmerer RW. (1998). Intellectual diversity: Bringing the native perspective into natural resources education. *Winds of Change, 13*, 14–20

Kimmerer, R. W. (2002). Weaving traditional ecological knowledge into biological education: A call to action. *BioScience, 52*(5), 432-438.

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. Doi 10.1007/s13412-012-0091-y.

Lavallee, L. F. (2009). Practical application of an Indigenous research framework and two qualitative Indigenous research methods: Sharing circles and Anishnaabe symbol-based reflection. *International Journal of Qualitative Methods, 8*(1), 21–40.

Le, T. N., & Gobert, J. M. (2015). Translating and implementing a mindfulness-based youth suicide prevention intervention in a Native American community. *Journal of Child and Family Studies, 24*(1), 12–23.

Le Grange, L. (2007). Integrating western and Indigenous knowledge systems: The basis for effective science education in South Africa? *International Review of Education,* 53, 577-591. doi:10.1007/s11159-007-9056-x

Le Grange, L. (2005). Guattari's philosophy of environment and its implications for environmental education in (Post)Colonial Africa. *Southern African Journal of Environmental Education, 22*(1),*35-45*.

Lillard, A. S. (2017). *Montessori: The science behind the genius. Third edition*. Toronto: Oxford University Press.

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder* (Rev. ed.). USA: Algonquin Books of Chapel Hill.

MacBeath, J. (2010). Living with the colonial legacy; The Ghana story. The Center for Commonwealth Education Report No 3. Retrieved from: https://www.educ.cam.ac.uk/centres/archive/cce/publications/CCE_Report_No3-Ghana_LivingTheColonialLegacy.pdf. June 20th 2019.

Mack, N., Woodsong, C., MacQueen, K., Guest, G., & Namey, E. (2005). In-depth interviews. *Qualitative Research Methods: A Data Collector's Field Guide* (pp.29–50). Research Triangle Park, NC: Family Health International.

Maila, M.W., & Loubser, C.P. (2003). Emancipatory Indigenous knowledge systems: Implications for environmental education in South Africa. *South African Journal of Education, 23*(4), 276 – 280.

Marouli, C. (2002). Multicultural environmental education: Theory and practice. *Canadian Journal of Environmental Education, 7*(1), 26-42.

Martusewicz, R., Edmundson, J., & Lupinacci, J. (2011). *Eco justice education toward democratic and sustainable communities.* New York: Routledge.

Marsh, T.N., Cote-Meek, S., Toulouse P., Najavits L.M., & Young, N.L. (2015). The application of two-eyed seeing decolonizing methodology in qualitative and quantitative research for the treatment of intergenerational trauma and substance use disorders. *International Journal of Qualitative Methods,* 1–13.

Marshall, A., Marshall, M, & Iwama, M. (2010) Approaching Mi'kmaq teachings on the connectiveness of humans and nature. In S. Bondrup-Nielsen, K. Beazley, G. Bissix, D. Colville, S. Flemming, T. Herman, M. McPherson, S. Mockford, & S. O'Grady (Eds.), *Ecosystem Based Management: Beyond Boundaries. Proceedings of the Sixth International Conference of Science and the Management of Protected Areas, 21–26 May 2007* (pp.174-177), Acadia University, Wolfville, Nova Scotia. Science and Management of Protected Areas Association, Wolfville, NS. Retrived from http://ntegrativescience.ca/uploads/articles/2010-Beyond-Boundaries-ecosystem-based-management-Marshall-Iwama-SAMPAA-2007-proceedings.pdf. July 26, 2020.

Masuku Van Damme, L.S., & Neluvhalani, F.N. (2004). Indigenous knowledge in environmental education processes: Perspectives on a growing research arena. *Environmental Education Research, 10*(3), 353-370.

Mathooko J. M. (2005). Application of traditional ecological knowledge in the management and sustainability of fisheries in East Africa: A long-neglected strategy? *Hydrobiologia, 537,* 1–6.

Martin, D.H. (2012). Two-eyed seeing: A framework for understanding Indigenous and non-indigenous approaches to Indigenous health research. *Canadian Journal of Nursing Research, 44*(2), 20-42.

Maurial, M. (1999). Indigenous knowledge and schooling: A continuum between conflict and dialogue. In L.M. Semali & J.L. Kincheloe (Eds.), *What is Indigenous knowledge: Voices from the academy* (pp. 59-77). New York: Falmer Press.

Mazonde, I.N. (2001). Culture and education in the development of Africa. *Development Encounters: Sites of Participation and Knowledge*, 1-36.

Mazrui, A.A. (1986). *The Africans: A triple heritage.* Greater Washington Educational Telecommunications Association.

Mazzocchi, F. (2006). Western science and traditional knowledge: Despite their variations, different forms of knowledge can learn from each other. *European Molecular Biology Organization, Reports. 7*(5).

McCarter, J., Gavin, M.C., Baereleo, S. & Love, M. (2014) The challenges of maintaining Indigenous ecological knowledge. *Ecology and Society 19*(3), 39-51. http://dx.doi.org/10.5751/ES-06741-190339

McGregor, D. (2005). Traditional ecological knowledge: An Anishnabe woman's perspective. Atlantis: *Critical Studies in Gender, Culture & Social Justice 29* (2), 103–109.

McGregor, D. (2008). Linking traditional ecological knowledge and western science: Aboriginal perspectives from the 2000 state of the lakes ecosystem conference. *The Canadian Journal of Native Studies, XXVIII*, 1139-1158.

McNee, L. (2004). The languages of childhood: The discursive construction of childhood and colonial policy in French West Africa. *African Studies Quarterly*, *7*, 20-32.

McPherson, J.M., Sammy, J., Sheppard, D.J., Mason, J.J., Brichieri-Colombi, T.A. & Moehrenschlager, A. (2016). Integrating traditional knowledge when it appears to conflict with conservation: Lessons from the discovery and protection of sitatunga in Ghana. *Ecology and Society, 21*(1), 24. Doi.org/10.5751/ES-08089-210124

McWilliam, H.O.A. (1959). *The development of education in Ghana*. London: Longmans, Green & Co.

McWillian, H.O.A., & Kwamena-Poh, M.A. (1975). *The development of education in Ghana.* London: Longman.

Meier, D. & Sisk-Hilton, S. (2017). Nature and environmental education in early childhood. *The New Educator*, *13*(3), 191-194, doi: 10.1080/1547688X.2017.1354646

Memmi, A. (1968). *Dominated man: Notes toward a portrait*. London: Orion Press.

Mensah, E. K. (2005). *A Narrative Study: The Meaning of Western Colonial/missionary Education for Contemporary Ghanaians*. (Publication No. NR18154) [Doctoral Dissertation, The University of Saskatchewan] ProQuest Dissertations Publishing

Merriam, E.O. (2007). *Learning in adulthood: A comprehensive guide*. San Francisco: Jossey-Bass.

Ministry of Education. (1974). The new structure and content of education for Ghana. Accra, Ghana.

Ministry of Women and Children's Affairs, Ghana. (2004). Early childhood care and development policy. Retrieved from http://www.ilo.org/dyn/natlex/docs/ELECTRONIC/88527/101252/F878960202/GHA88527.pdf September 10th, 2019.

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 (KG 1&2). Kindergarten curriculum for preschools. National Council for Curriculum and Assessment. Ministry of Education, Accra, Ghana

Ministry of Environment Science and Technology. (2012). National assessment report on achievement of sustainable development goals and targets for rio+20 conference. Republic of Ghana. Retrieved from https://sustainabledevelopment.un.org/content/documents/1016ghananationalreport.pdf. September 14, 2017.

Mkabela, Q. (2005). Using the Afrocentric method in researching indigenous African culture. *The Qualitative Report, 10*(1), 178–189. Doi.org/10.46743/2160-3715/2005.1864.

Morrison, J.W. (2012). Early care and education in Ghana. *Childhood Education International, 77*(4), 214-218.

Mueller, M., & Bentley, M. (2009). Environmental and science education in 'Developing nations': A Ghanaian approach to renewing and revitalizing the local community and ecosystems. *The Journal of Environmental Education, 40*(4), 53 - 64.

Mundy-Castle, A.C. (1974). Social and technological intelligence in Western and non-Western cultures. Universita (University of Ghana), 4, 46.

Muyila, J.W. (2006). African values and the problem of the rights of the child: A search for explanations. In: A.K. Tonnesen (Ed.): *Research Partnership 3/ 2006* (pp. 1-53). *Copenhagen: The Danish Institute for Human Rights,* 1- 53.

Nadasdy, P. (1999). The politics of TEK: Power and the "integration" of knowledge. *Arctic Anthropology, 36*(1/2) 1-18.

Nadasdy, P. (2007). Adaptive co-management and the gospel of resilience. In D. Armitage, F. Berkes, & N. Doubleday (Eds.), Adaptive co-management: Collaboration, learning and multi-level governance (pp. 208-226). University of British Columbia Press, Vancouver, Canada.

Nakashima, D. (1993). Astute observers on the sea ice edge: Inuit knowledge as a basis for Arctic co-management. In J. Inglis (Ed.), Traditional Ecological Knowledge: Concepts and Cases (pp. 99-110). Ottawa, ON: International Program on Traditional Ecological Knowledge and International Development Research Centre.

Ndofirepi, A.P. (2011). Philosophy for children: the quest for an African perspective. *South African Journal of Education.* (31), 246-256

Ndofirepi, A. P., & Shumba, A. (2014). Conceptions of "child" among traditional Africans: A philosophical purview. *Journal of Human Ecology, 45*(3), 233-242. Doi.org/10.1080/09709274.2014.11906696.

Nesterova, Y. (2020). Rethinking environmental education with the help of Indigenous ways of knowing and traditional ecological knowledge. *Journal of Philosophy of Education,* 54 (4), 1047-1052.

North American Association for Environmental Education. (2010). *Early Childhood Environmental Education Programs: Guidelines for Excellence*. Washington, DC.

Nowell, L.S., Norris, J.M., White, D.E., & Moules, N.J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*, 1–13.

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. Doi:10.1002/cad.20072.

Ngozi, A. & Duruji, S.U. (2013). Education in the traditional African society. An examination. *Manly Academia*. Retrieved from: https://manlyacademia.wordpress.com/2013/05/07/education-in-the-traditional-african-society/. April 6, 2018

Nkosi, Z. (1999). Spirituality, Land and Land Reform in South Africa. South Africa. Retrieved from: http://www.wcc-coe.org/wcc/what/jpc/echoes-16-05.html. August 25, 2019.

Nsamenang, B. (2005). The intersection of traditional African education with school learning. In L. Swatz, C. de la Ray, & D. Noman (Eds.). *Psychology: An introduction* (pp. 327-337)., Cape Town South Africa: Oxford University Press.

Nsamenang, A.B. (2007). A critical peek at early childhood care and education in Africa. *Child Health and Education, 1*(1), 14-26. doi=10.1.1.586.7464.

Nsamenang, A.B. (2008). (Mis) Understanding ECD in Africa: The force of local and global motives. In M. Garcia, A. Pence, & J.L. Evans (Eds.). *Africa's Future, Africa's Challenge: Early Childhood Care and Development in Sub-Saharan Africa* (pp.135-146). Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Nsamenang, A.B., & Tchombe, T.M.S. (Eds.). (2011). *Handbook of African educational theories and practices: A generative teacher education curriculum presses*. Bamenda, North West Region Cameroon: Human Development Resource Centre (HDRC).

Ntuli, P. (1999). The missing link between culture and education: Are we still chasing gods that are not our own ? In: M.W. Makgoba (Ed.). *African renaissance*. Cape Town: Mafube-Tafelberg.

Nyarkoh, E. & Intsiful, E. (2018). An assessment of the impact of international aid on basic education in Ghana. *American Journal of Educational Research, 6*(1), 43-49. Doi:10.12691/education-6-1-7.

Obiora, A.C., & Emeka, E.E. (2015). African indigenous knowledge system and environmental sustainability. *International Journal of Environmental Protection and Policy*, *3*(4), 88-96. doi: 10.11648/j.ijepp.20150304.12

Obanya, P. (2011). Foreword. In A. B. Nsamenang., & T.M.S. Tchombe (Eds.), *Handbook of African educational theories and practices: A generative teacher education curriculum presses* (pp. xxv- xxvi). Bamenda, North West Region Cameroon: Human Development Resource Centre (HDRC).

Odora Hoppers, C. (Ed.). (2002). *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation.* Cape Town: New Africa Books.

Ogbu, J.U. (1992). Understanding cultural diversity and learning. *Educational Researcher*, *21*(8), 5-14, 24.

Ogunniyi, M.B. (1995). World view hypothesis and research in science education. Proceedings of the Annual Meeting of the Southern African Association for Research in Mathematics and Science Education, 613-624

Okai, M., & Amoah, A.K. (2016, August 26). How far with Ghana's early childhood care and development?. *Modern Ghana*. Retrieved from https://www.modernghana.com/news/715064/how-far-with-ghanas-early-childhood-care-and-development.html. September 14th, 2018.

Okeke, C.O., Ibenwa, C.N, & Okeke, G.T. (2017). Conflicts between African traditional religion and Christianity in eastern Nigeria: The Igbo example. Sage DOI: 10.1177/2158244017709322

Okolie A. C. (2003). Producing knowledge for sustainable development in Africa: Implications for higher education. *Higher Education, 46*(2), 235–260. Doi: 10.1023/A:1024717729885.

Oppong, S. (1993). Towards a first start for children. Paper presented at the meeting of the National Seminar of Early Childhood Development, Accra, Ghana, West Africa.

Omolewa, M. (2007). Traditional African modes of education: Their relevance in the modern World. *International Review of Education,53*, 593–612. doi 10.1007/s11159-007-9060-1.

Omolewa, M. (2007). African Thought. Entry on education for the *Encyclopedia of African Thought*, ed. by F.A. Irele, & B. Jeyifo. Oxford University Press.

Onwauchi, P.C. (1972). African peoples and western education. *The Journal of Negro Education*, *41*(3), 241-247.

Owuor J.A. (2007). Integrating African Indigenous knowledge in Kenya's formal education system: The potential for sustainable development. *Journal of Contemporary Issues in Education, 2*(2), 21-37.

Owu-Ewie, C. (2006). The language policy of education in Ghana: A critical look at the English-only language policy of education. Athens, Ohio: Ohio University. Retrieved from http://www.lingref.com/cpp/acal/35/paper1298.pdf. July 17th, 2019.

Ozioma, E.O.J., & Okaka, A.N.C. (2019). Herbal medicines in African traditional medicine. In P. Builders. *Herbal Medi*cine (pp.191-214). IntechOpen Ed. Doi: 10.5772/intechopen.80348.

Parrota, T.A., & Trosper, R.L. (Eds.). (2012). *Traditional Forest Related Knowledge: Sustaining Communities, Ecosystems and Biocultural Diversity*. New York: Springer.

Patrut, A., Von Reden, K.F., Lowy, D. A., Alberts, A.H., Pohlman, J. W., Wittmann, R., Gerlach, D. Xu, L. & Mitchell, C.S. (2007). Radiocarbon dating of a very large African baobab. *Tree Physiology, 27*, 1569–1574.

Palmer, R. (2005). *Beyond the Basics: Post-basic Education and Training and Poverty Reduction in Ghana*. Post-Basic Education and Training Working Paper Series No 4, Centre of African Studies, University of Edinburgh. Retrieved from http://www.cas.ed.ac.uk/research/projects.html. August 29, 2019.

Pearson, E., & Degotardi, S. (2009). Education for sustainable development in early childhood education: A global solution to local concerns?. *International Journal of Early Childhood, 41*(2), 97-111.

Pence, A. &, Shafer, J. (2006). Indigenous knowledge and early childhood development in Africa: The early childhood development virtual University. *Journal for Education in International Development, 2*(3), 1-16.

Pence, A.R., & Marfo, K. (2008). Early childhood development in Africa: Interrogating constraints of prevailing knowledge bases. *International Journal of Psychology*, *2*, 78-87.

Pence, A.R., & Nsamenang, A.B. (2008). *A case for early childhood development in Sub-Saharan Africa*. The Hague: Bernard van Leer Foundation.

Phiri, A.D.K. (2008). Exploring the integration of indigenous science in the primary school Science curriculum in Malawi. (Unpublished doctoral dissertation). Blacksburg, VA: Virginia Polytechnic Institute and State University.

Pierotti, R., & Wildcat, D. (2000). Traditional ecological knowledge: The third alternative (Commentary). *Ecological Applications, 10*(5), 1333-1340.

Pooley A.C. & Gans, C. (1976). The Nile crocodile. *Scientific American*, *234* (4), 114-125.

Poppell, K. & Monroe, M.C. (2017). Why is exposure to nature important in early childhood? Retrieved from https://edis.ifas.ufl.edu/pdf%5CFR%5CFR39400.pdf. April 30th, 2021.

Preston, J.P., Cottrell, M., Pelletier, T.R., & Pearce, J.V. (2011). Aboriginal early childhood education in Canada: Issues of context. *Journal of Early Childhood Research, 10*(1) 3–18.

Prochner, L., & Kabiru, M. (2008). ECD in Africa: A historical perspective. In M. Garcia, A.Pence, & J.L. Evans (Eds.), *Africa's Future, Africa's Challenge Early Childhood Care and Development in Sub-Saharan Afri*ca (pp.117-130). Washington, DC: The International Bank for Reconstruction and Development / The World Bank.

Pyle, R.M. (2003). Nature matrix: Reconnecting people and nature. *Oryx, 37,* 206–214.

Reid, A., Teamey, K., & Dillon, J. (2002). Traditional ecological knowledge for learning with sustainability in mind. *The Trumpeter, Journal of Ecosophy, 18*(1), 113-136.

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.

Rollnick M. & Rutherford M. (1996). The use of mother tongue and English in the learning and expression of science concepts: a classroom-based study. *International Journal of Science Education, 18*(1), 91-103. Doi: 10.1080/0950069960180108

Ruddle, K. (1991). *The transmission of traditional ecological knowledge*. Centre for Development Studies, University of Bergen, Norway. Retrieved from: https://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/1494/The_Transmission_of_Traditional_Ecological_Knowledge.pdf?sequence=1&isAllowed=y. October 1, 2018.

Saldana, J. (2016). *The coding manual for qualitative researchers.* Los Angeles, CA: Sage.

Sauvé, L. (1997). Canada - Environmental education and the sustainable-development perspective. Retrieved from; http://allies.alliance21.org/polis/spip.php?article120. June 16th , 2017.

Schafer, J., Ezirim, M., Gamurorwa, A., Ntsonyane, P., Phiri, M., Sagnia, J., Salakana, L. & Bairu, W.W. (2004). Exploring and promoting the value of Indigenous knowledge in early childhood development in Africa. *International Journal of Educational Policy, Research, & Practice, 5*(3), 61-80.

Schultz, T.W. (1961). Investment in human capital. *American Economic Review, 51,* 1-17.

Seawright, G. (2014). Settler traditions of place: Making explicit the epistemological legacy of white supremacy and settler colonialism for place-based education. *Educational Studies, 50*(6), 554–572.

Semali, L. M., & Kincheloe, J. L. (1999). Introduction: What is Indigenous knowledge and why should we study it? In L. M. Semali & J. L. Kincheloe (Eds.), *What is Indigenous knowledge? Voices from the academy* (pp. 3–58). New York, NY: Falmer Press.

Semali, L., & Stambach, A. (1997). Cultural identity in an African context: Indigenous education and curriculum in East Africa. *Folklore Forum 28*(l), 3-27.

Serpell, R. (1993). *The Significance of Schooling: Life-Journeys into an African Society*. Cambridge, UK: Cambridge University Press.

Serpell, R. (1994). An African social ontogeny: Review of A. Bame Nsamenang (1992), Human development in cultural context. *Cross-Cultural Psychology Bulletin, 28*(1), 17–21.

Sharan, M.B. (1988). *Case study research in education*. San Francisco: Jossey-Bass.

Shava, S. (2008). Indigenous knowledges: A genealogy of presentations and applications in developing contexts of environmental education and development in Southern Africa. (Unpublished doctoral dissertation). Pretoria: Rhodes University.

Sheya, E. (2014). *Indigenous knowledge and environmental education : A case study of selected schools in Namibia.* Thesis presented in fulfilment of the requirements for the degree of Master of Education in Curriculum Studies (Environmental Education) at Stellenbosch University.

Shiva, V. (2000). Foreword: Cultural diversity and the politics of knowledge. In G.J.S. Dei, B.L. Hall, & D.G Rosenberg. (Eds.), *Indigenous Knowledge in the global contexts: Multiple readings of our world* (pp. vii-x). Toronto: University of Toronto Press.

Shiva, V. (1997). The real meaning of sustainability. In D.E. Cooper, & J.A. Palmer (Eds), *The environment in question: Ethics and global issues.* (pp.186-193). London: Routledge.

Sobel, D. (1996). *Beyond ecophobia*. Great Barrington, MA: Orion Society.

Sobel, D. (2004). *Place-based education: Connecting classrooms and communities*. Great Barrington, MA: The Orion Society.

Simandiraki, A. (2006). International education and cultural heritage alliance or antagonism? *Journal of Research in International Education*, *5*(1), 35–56.

Simpson, L. (2000). Anishinaabe ways of knowing. In J. Oakes, R. Riew, S. Koolage, L. Simpson,& N. Schuster (Eds.), *Aboriginal health, identity and resources* (pp. 165-185). Winnipeg, Manitoba, Canada: Native Studies Press.

Simpson, L. (2001). Aboriginal peoples and knowledge: Decolonizing our processes. *The Canadian Journal of Native studies, XXI* (1),137-148.

Simpson, L. (2002). Indigenous environmental education for cultural survival. *Canadian Journal of Environmental Education, 7*(1), 13-25.

Sinclair, R. (2003). Indigenous research in social work: The challenge of operationalizing worldview. *Native Social Work Journal, 5,* 117-139.

Smith, G.A., & Sobel, D. (2010). *Place- and community-based education in schools*. New York: Routledge.

Smith, L.T. (1999). *Decolonizing methodologies: Research and Indigenous Peoples.* London, UK: Zed Books Ltd.

Smith, G.A. (2002). Place-based education: Learning to be where we are. *Phi Delta Kappan*, *83,* 584–594. Doi:10.1177/003172170208300806

Snively, G., & Williams, W.L. (2016). *Knowing home: Braiding Indigenous science with Western science, Book 1.* Victoria, BC, Canada: University of Victoria Press.

Sundar, N. (2002). "Indigenise, nationalise, spiritualise" — an agenda for education? *International Social Science Journal,* 54, 373–383. doi.org/10.1111/1468-2451.00389

Swart, E. R. (1963). Age of the baobab tree. *Nature (Lond.),* 198, 708-709.

Swamy, L., Drazen, E., Johnson, W.R., & Bukoski, J. (2017). The future of tropical forests under the United Nations Sustainable Development Goals. *Journal of Sustainable Forestry, 37*(7610), 1-36. DOI: 10.1080/10549811.2017.1416477

Tackie-Ofosu, V., Mahama, S., Vandyck, E.S.T.D., Kumador, D.K., & Toku, N.A.A. (2015). Mother tongue usage in Ghanaian pre-schools: Perceptions of parents and teachers. *Journal of Education and Practice, 6*(34), 81-87.

Tanyanyiwa, V.I. (2019). Indigenous Knowledge systems and the teaching of climate change in Zimbabwean secondary schools. SAGE Open, 1-9. Doi:10.1177/215824401988514

Taylor, D. E. (1996). Making multicultural environmental education a reality. *Race, Poverty & the Environment, 6*(2/3), 3-6

Taylor A.F., & Kuo, F.E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders, 12*(5), 402-409.

Taiwo, O. (1976). *Culture and the Nigerian Novel*. New York: St Martin's Press.

Tedla, E. (1995). *Sankofa: African thoughts and education*. New York: Peter Lang.

Thabede D. (2008). The African worldview as the basis of practice in the helping professions. *Social Work/Maatskaplike Werk, 44*(3), 233-245.

Thomas, R. (2005). Honouring the oral traditions of my ancestors through storytelling. In L. Brown, & S. Strega (Eds), *Research as Resistance – Critical, Indigenous and Anti-oppressive Approaches* (pp. 237-254). Toronto: Canadian Scholars Press.

Tongco, M.D. (2007). Purposive sampling as a tool for informant selection. *A Journal of Plant, People and Applied Research Ethnobotany Research and Applications, 1*(12), 147-158.

Tilbury, D. (1994). The critical learning years for environmental education. In R.A. Wilson (Ed.). *Environmental Education at the Early Childhood Level (*pp. 11-13). Washington, DC: North American Association for Environmental Education.

Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of environmental education in the 1990s. *Environmental Education Research, 1*(2), 195-212.

Tsuji, L.J.S., & Ho, E. (2002). Traditional environmental knowledge and western science: In Search of Common Ground. *The Canadian Journal of Native Studies, 2*(2), 327-360.

Tuck, E. & McKenzie, M. (2014). *Place in research: Theory, methods, and methodology*. New York: Routledge.

Turner, N.J., Ignace, M. B. & Ignace, R.(2000). Traditional ecological knowledge and wisdom of Aboriginal Peoples in British Columbia. *Ecological Applications, 10*(5), 1275-1287.

United Nations Environment Programme [UNEP]. (1998). Report of the fourth meeting of the parties to the convention on biodiversity. Nairobi, Kenya: United Nations Environment Programme, UNEP/CBD/COP/ 4/27.

UNESCO (2000) The Dakar framework for action: education for all—meeting our collective needs, paper presented at the World Education Forum, Dakar, Senegal, 26–28 April. Retrieved from https://sustainabledevelopment.un.org/content/documents/1681Dakar%20Framework%20for%20Action.pdf. November 5th, 2020.

United Nations International Children's Emergency Fund [UNICEF]. (2004). Annual report. New York: Author. Retrieved from; https://www.unicef.org/publications/files/UNICEFAnnualReport2004_eng.pdf. December 28th 2018.

United Nations. (2005). Permanent forum on indigenous people: Report on the fourth session. Economic and Social Council Report, Supplement No. 23. New York: Author.

United Nations Educational, Scientific and Cultural Organization [UNESCO]. (2006). *EFA global monitoring report 2007: Strong foundations: Early childhood care and education*, UNESCO.

United Nations Educational, Scientific and Cultural Organization [UNESCO] International Bureau of Education (IBE). (2006). Country profile prepared for the Education for All Global Monitoring Report 2007 Strong Foundations: Early Childhood Care and Education Ghana Early Childhood Care and Education (ECCE) programmes. Retrieved from; http://unesdoc.unesco.org/images/0014/001471/147192e.pdf. September 21, 2018

United Nations Environment Programme .(2012). Africa Environmental Education and Training Action Plan 2015-224. Strengthening Sustainable Development in Africa. Retrieved from: file:///C:/Users/Gale/Downloads/Africa%20Environmental%20Education%20and%20Tra

ining%20Action%20Plan%202015%E2%80%932024%20(1).pdf. Last accessed October 12, 2017.

van der Merwe, A. (2010). Does human capital theory explain the value of higher education? A South African case study. *American Journal of Business Education, 3*(1), 107-118. Doi.org/10.19030/ajbe.v3i1.378

Van er Walt, B.J. (1997). *Afrocentric or Eurocentric? Our task in a multicultural South Africa*. Potchefstroom: Potchefstroom University.

Wallin, A. (2017). Nature play is important for the cognitive development of early learners. Retrieved from: http://www.informalscience.org/news-views/nature-play-important-cognitive-development-early-learners. October 20th 2018.

Wane, N. N. (2002). African women and spirituality: Connection between thought and education. In E. O'Sullivan, A.Morrell, & M. O'Connor (Eds.), *Expanding the boundaries of transformative learning: Essays on theory and praxis* (pp. 135- 150). New York: Palgrave, St. Martin's Press

Wa Thiong'o, J.N. (1967). *Weep not child*. London: Heinemann

Wells, N., & Evans, G. (2014). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior, 35*(3), 311-330.

Weisner, T.S. (1997). Support for children and the African family crises. In T.S. Weisner, C. Bradley, & C.P. Kilbride (Eds.). *African families and the crises of social change* (pp.20-40). Westport, CT: Bergin & Garvey.

Weikart, D.P. (1971). Relationship of curriculum, teaching, and learning in preschool education. 35p.; Paper presented at the Hyman Blumberg Memorial Symposium on Research in Early Childhood Educaticn, Baltimcre, Maryland, February, 1971. Retrieved from; https://files.eric.ed.gov/fulltext/ED049837.pdf. April 21, 2020.

Wildcat, M., McDonald, M., Irbacher-Fox, S., & Coulthard, G. (2014). Learning from the land: Indigenous land based pedagogy and decolonization. *Decolonization: Indigeneity, Education & Society, 3*, I–XV.

Wilson, R. (1994). Environmental education at the early childhood level. Washington, D.C.: North American Association for Environmental Education.

Wilson, R.A. (1996). *Starting early: Environmental education during the early childhood years*. (ERIC Digest). Columbus, OH: ERIC Clearinghouse for Science, Mathematics and Environmental Education (ERIC Identifier ED 402147).

Wilson, S. (2001). What is an indigenous research methodology? *Canadian Journal of Native Education,* 25 (2), 166-174.

Wilson, S. (2008). *Research is ceremony: Indigenous research methods*. Black Point, NS, Canada: Fernwood Publishing.

Wood, P.J. (1992). The botany and distribution of *Faidherbia albida*. In Vandenbeldt, R.J., (Ed.), *Faidherbia albida* in the West African semi-arid tropics: Proceedings of a workshop, Apr 22-26, 1991 (pp 9-17). India: International Crops Research Institute for the Semi-Arid Tropics; and Nairobi, Kenya: International Centre for Research in Agroforestry.

Woodhouse, H., & Ndongko, T. (1993). Women and science education in Cameroon: Some critical reflections. *Interchange*, *24*(1 & 2), 131-158.

World Bank Report. (2006). Ghana country environmental analysis September 06, 2006 Environmentally and Socially Sustainable Development Department (AFTSD) Africa Region. Report No: 36985-GH

Yilmaz, S. (2016). Outdoor environment and outdoor activities in early childhood education. *Mersin Üniversitesi Eğitim Fakültesi Dergisi,*12(1), 423-437. Doi: http://dx.doi.org/10.17860/efd.80851

Yin, R.K. (2003). *Case study research, design and methods* (3rd ed., vol. 5). Thousand Oaks, CA: Sage.

Zainal, Z. (2007). Case study as a research method. *Utirum Jurnal Kemanusiaan, 5*(1), 1–6.

Zamani, Z. (2016). 'The woods is a more free space for children to be creative; their imagination kind of sparks out there': Exploring young children's cognitive play opportunities in

natural, manufactured and mixed outdoor preschool zones. *Journal of Adventure Education and Outdoor Learning, 16*(2), 172-189.

APPENDIX A: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN BOANIA PRIMARY SCHOOL

John Bosco Acharibasam
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University of Saskatchewan
28 Campus Drive
Saskatoon, SK S7N 0X1, Canada

January 10th, 2020

The Director General
Ghana Education Service
Accra

Dear Sir,

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN BOANIA PRIMARY SCHOOL

My name is John Bosco Acharibasam, a PhD candidate at the Department of Educational Foundations, University of Saskatchewan. I write to apply for permission to conduct research at Boania Primary School in the Kassena-Nankana West District. For my thesis, I am researching the *'Integration of Indigenous Ecological Knowledge into Early Childhood Education in Boania Primary school'*. The choice of a rural school is influenced by Masuku Van Damme and Ndlovhalani's (2004) assertion that although Indigenous Knowledge is fast diminishing in Africa, remnants of it still exist in rural areas of the continent. The research will run from January 2020-April, 2020.

In the context of Africa and Ghana, scholars (Adjei, 2007; Dei, 2004; Nsamenang, 2005; 2007; Nsamenang & Tchombe, 2011; Pearson & Degotardi, 2009; Pence & Nsamenang, 2008; Pence & Shafer, 2006) have observed that Western content dominates Indigenous Knowledges (IKs) in Education. This is particularly true with the model of Early Childhood Education (ECE) that is currently practiced on the continent (see, Nsamenang, 2005;2007; Nsamenang & Tchombe, 2011). It is therefore recommended that Africa finds ways to integrate IK into Early Childhood Education (Nsamenang,2007). Especially, with the realization that when many students from Indigenous and rural communities start formal school in the African context, they do not completely abandon their Indigenous knowledges in favour of Western knowledge, but instead tend to seek ways of holding onto both knowledge systems (Jegede, 1995; Ogunniyi, 1995).

Ghana has made several efforts to include Indigenous Knowledges (IKs) in formal education especially in ECE. However, research shows more still needs to be done to connect formal schooling to the daily realities of many students (Abdulai, 2016). Abdulai (2016), for example, concluded that although Indigenous languages are used as a medium of instruction in ECCD, most Indigenous plays are not used for instruction at the early childhood level because

APPENDIX A: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN BOANIA PRIMARY SCHOOL

they are not catered for in the Ghanaian ECCD curriculum. Part of the problem is that most IKs are not contained in ECE text books or curriculum and there is no approach or guiding principle (like two-eyed seeing) to help teachers integrate Indigenous content into ECE. Therefore, it has been observed that Western content continuous to dominate IK in ECE (Abdulai, 2016; Dei, 2004; Pence & Marfo, 2008).

Therefore, the purpose of this study is to find out how Indigenous Ecological Knowledge (IEK) can be integrated into classroom environmental studies at the early childhood level.

To do this the research will adopt an approach called two-eyed seeing. This approach encourages the use of both Western knowledge and Indigenous knowledges not as two conflicting knowledge waves but as two distinct knowledge systems that can exist side by side in the classroom (Bartlett, 2009; Bartlett et al., 2012; Iwama et al., 2009). It encourages teachers to teach ECE curricula with the understanding that IEK and Western knowledge are equal.

My research sample will include 8 second level kindergarten (K-2) pupils, 2 teachers and 2 Indigenous Elders from Boania Primary School and the community of Boania respectively. I understand the ethical issues that may emerge when researching a vulnerable population like children. Hence, consent will be sought from parents first before children participate in this research. Secluded interviews (in the presence of the teacher) will also be held with children but not close enough for the teachers to hear what children say and the interview environment will be made more playful and tension free. Again, to not burden children with too many interview questions, the interview guide is kept brief and children are allowed to either answer questions verbally or draw responses. Besides, children would be informed that they can refuse to answer questions they are not comfortable with and to walk away from the interview anytime they want. For the other research participants (2 teachers and 2 Elders), consent will be sought by informing them fully about the purpose, methods, and the intended uses of the study, what their participation in the research entails and what risks, if any, are involved. Next, their consent would be sought appropriately to participate voluntarily and free from any coercion.

Most importantly, participants would be assured that what they say will be kept in confidence to ensure trust and they are even to walk away from the research anytime without consequences. Analyzed data will be sent back to research participants to verify if participants agree with the researchers' interpretations of what they meant. I am also aware that the Ghana Education Service is against the use of formal assessments in ECCD. For this, the interview questions with children will be informal with different response options. For example, children will be made aware that they are allowed to draw their responses; they have the right to refuse to answer questions they are not comfortable with or even walk away from the interviews at any time. Similarly, in order not to cause any distractions to teaching and learning, IEK will be integrated into classroom environmental studies lessons as examples to already existing topics.

APPENDIX A: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN BOANIA PRIMARY SCHOOL

Please let me know if there is any additional information you need, and I hope my application meets your expectation.

Yours faithfully,

John Bosco Acharibasam
PhD Candidate: Educational Foundations

CC: The Director
Research, Statistics and Information
Management
Ghana Education Service
Accra

The District Director of Education
Ghana Education Service, Paga
Kassena-Nankana West District

APPENDIX B: APPROVAL FROM THE GHANA EDUCATION SERVICE

GHANA EDUCATION SERVICE

In case of reply, the number and date of this letter should be quoted.

My Ref. No.: GES/BED/MSCU/2020/004

Your Ref. No .....

Republic of Ghana

HEADQUARTERS
Ministry Branch Post Office
P.O. Box M 45
Accra

16th January, 2020

THE REGIONAL DIRECTOR
GHANA EDUCATION SERVICE
UPPER EAST REGION

RE: APPROVAL TO INTERVIEW KINDERGARTEN PUPILS AND TEACHERS IN BOANIA PRIMARY SCHOOL IN KASENA NANKANA WEST DISTRICT

NAME: JOHN BOSCO ACHARIBASAM

Approval is granted to the above-mentioned candidate who has applied for permission to interview pupils and teachers of the above school.

Please provide further directions to the concerned District Director to enable him proceed.

A copy of the letter is attached for ease of reference.

Thank you

PATTY E. ASSAN (MRS.)
DIRECTOR, BASIC EDUCATION DIVISION
For: DIRECTOR-GENERAL

cc: The Director-General, GES HQ, Accra
The Deputy Director-General (MS), GES HQ, Accra
The Deputy Director-General (Q&A), GES HQ, Accra
John Bosco Acharibasam, Accra

APPENDIX C: APPROVAL FROM THE REGIONAL EDUCATION OFFICE

GHANA EDUCATION SERVICE

In case of reply, the number and date of this letter should be quoted.

Our Ref:

Your Ref:

REGIONAL EDUCATION OFFICE
BOX 110
BOLGATANGA

24 JANUARY, 2020

RE-APPROVAL TO INTERVIEW KINDERGARTEN PUPILS AND TEACHERS IN BOANIA PRIMARY SCHOOL IN KASENA NANKANA WEST DISTRICT: JOHN BOSCO ACHARIBASAM

Your request to interview Kindergarten pupils and teachers in Boania primary school in Kasena Nankana West District is granted.

You will report to the District Director for further discussions and directions to enable you proceed.

Find attached approval letter from Director, Basic Education, Accra.

Thank you.

Mr. John Bosco Acharibasam
Room 3104,
Department of Education Foundations,
University of Saskatchewan,
28 Campus Drive,
Saskatoon, SK S7N 0X1.Canada.

CC:

The Director-General, GES HQ, Accra.
The Deputy Director-General (MS), GES HQ, Accra.
The Deputy Director-General (Q&A), GES HQ, Accra.
The Director Basic Education Division, GES HQ Accra.
The District Director, GES, KNW.