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Thinking Outside the Circle: Reflections on Theory and Methods for School-Based Garden Research

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School-based gardens (SBGs) are contributing to improvements in many areas of education, including nutrition, health, connectedness and engagement of students. While considerable research has been conducted in other parts of the world, research in Australia provides limited understanding of the impact of SBGs. The aim of this paper is to give a reflective viewpoint on the impact of SBGs in Australia from the perspective of an Aboriginal philosophical approach called *Dadirri*. The philosophy highlights an Australian Aboriginal concept, which exists but has different meanings across Aboriginal language groups. This approach describes the processes of deep and respectful listening. The study uses photovoice as a medium to engage students to become researchers in their own right. Using this methodology, students have control over how they report what is significant to them. The use of photovoice as a data collection method is contextualised within the Aboriginal philosophical approach to deep listening. For the first author, an Aboriginal researcher (Clague), the journey is to find a research process that maintains cultural integrity and resonates with the participants by affirming that a culturally sensitive approach to learning is important.

■ **Keywords:** *Dadirri*, *Gan 'na*, photovoice, learners, school-based garden

This paper presents a rationale and methodology for a research approach that has cultural integrity and resonates with the participants by affirming that a culturally sensitive approach to learning is important. The philosophical approach of *Dadirri*, the way of deep listening will then be linked to the methodological approach of the research. Photovoice is presented as a methodology that accesses the views or perspectives of all children, especially Aboriginal children, to find out what SBGs mean to them. This research aims to increase awareness and learning that arise from being in school-based gardens (SBGs) from an Aboriginal philosophical approach for all participants within the research.

School-Based Gardens

It is necessary to clarify the background of SBGs, and their benefits. The practice of SBGs appears to reflect a range of philosophical beliefs that espouse the benefits of gardening and outdoor learning experiences. Subramaniam (2002) reviewed the historical, philosophical and underlying theoretical frameworks of garden-based learning (GBL) by acknowledging, 'the philosophy behind garden based education is actually an amalgamation of the philosophies behind experiential education, ecological literacy, environmental awareness and agricultural literacy. In other words, it involves teaching children through personal discovery in natural settings where they learn ecological principles that govern all life, as well as develop a sense of connection with the land' (2002, p. 1).

GBL is not a new practice or phenomena. Internationally, school garden programmes are represented at all levels of schooling in research emerging from America (Blair, 2009; Gupta, 2013; Mullin, 2011; Ozer, 2007; Parmer, Salisbury-Glennon, Shannon, & Struempler, 2009; Robinson-O'Brien, Story, & Heim, 2009), Canada (Skinner, Chi, and the Learning-Garden Educational Assessment Group, 2012; Barron, 1993) and Europe (Dillon, Rickinson, Sanders, Teamey, & Benefield, 2003). Turner, Eliason, Sandoval and Chaloupka (2016) examined the prevalence of school garden programmes in the United States public elementary schools. They looked at the time trends, demographic and regional disparities

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and found garden programmes had increased overtime, though there was room for wider implementation, particularly at schools serving lower income students. Due to 'the role of childhood in establishing food preferences and dietary consumption habits, garden programs are important and can reinforce the message imparted through nutrition education' (2016, p. 906).

In the study by Somerset and Bossard (2009), the objective was to determine the prevalence and usage of food gardens in primary school in three distinct climatic regions of northern-eastern Australia. Out of the 128 schools that participated, 37 schools had food gardens. 92% believed their garden was successful. The teacher's involvement emerged as an essential component in garden establishment and sustainability.

Benefits of SBGs

Students, today, are growing up immersed in different ways of learning that may or may not address their needs as learners. SBGs could be one way to engage students in a whole range of learning including science, health, nutrition, agricultural skills as well as academic links to many other curriculum areas. While SBGs encompass programmes, activities and projects with children, in which the garden is the foundation for integrated learning in and across discipline areas, engaging real-world experience can have personal meaning. It, therefore, requires careful consideration acknowledging that there are many different ways of structuring interventions for improving learning, health and social skills.

There is no single accepted approach; this is discussed in a synthesis of research between 1990 and 2010 by William and Dixon (2013) of the impacts of GBL on academic outcomes for schools, science had the highest proportion effect, followed by math and language art. National health outcome reports from Australia have highlighted the need to develop programmes that have a health promotion focus to address the high prevalence of obesity in children in Australia. One way this has been addressed is through the establishment of SBG programmes. A study in Australia by Somerset, Ball, Flett, and Grissman (2005) considered the importance of good nutrition to achieve healthy growth and development by students. The rationale was to increase healthy dietary patterns and reduce the risk of chronic diseases such as diabetes later in life. They acknowledged that SBG programmes represented an important vehicle for nutritional behavioural changes, which could provide lifelong benefits.

A study by Davis, Spaniol and Somerset (2015) reflects the most recent and well-publicised example of maximising the impact of school gardens on health outcomes. Davis et al. (2015) discuss reviewing 13 studies looking at the impact of garden-based programmes during and after school. An evaluation of *Stephanie Alexandra Kitchen Garden Scheme* confirmed that the initiative resulted in improved nutritional knowledge and nutritional benefits for learners (Block, Johnson, & SAKG, 2009; Yeatman et al., 2013). The popular success of these programmes has attracted widespread media attention and thus SBGs are remaining a familiar aspect of Australian school culture (Cutter-Mackenzie, 2009; Malone & Tranter, 2005).

Somerset and Markwell (2008) conducted research trialled over a 12-month period using an intervention consisting of a class-based, self-administered questionnaire. They found an enhanced ability to identify individual vegetables and fruit.

Studies have also shown that involvement in SBGs have changed outcomes in science (McArthur, Hill, Trammel, & Morris, 2009; Pigg, Waliczek, & Zajicek, 2006; Skelly & Bradley, 2007; Smith & Motsenbocker, 2005). Smith and Motsenbocker found that the purpose of the school garden 'is not to have an elaborate landscape but to create a "living laboratory" for student's observation of science concepts in the real world and experimentation in an unpredictable environment' (2005, p. 439). The main sample population in this study was African–Americans from low income, inner city public schools with disadvantaged backgrounds with the hope of finding new ways to engage students in science. William and Brown (2012) highlight learning through gardens and sustainability education in a holistic approach by bringing life to school and schools to life. SBGs provide significant outcomes for engagement with nature (Gill, 2014). These include elements such as positive changes in attitudes towards science and agriculture when measured pre and post programme. Additionally, it was shown that students developed a deeper communication with their communities, land and elders. Other positive outcomes through the component of incorporating a community service activity in the programme occurred.

More recently, Louv (2009) has also referred to the benefits of gardens as a means to reconnect students to nature. It may address the educational benefits because of the hands-on, experiential learning as well as the real-world outcome of the application (Barron, 1993; Kutsunai, 1994) or it may lead to other areas being identified as associated with the pedagogy of the situation. Aboriginal peoples were cultivating or 'gardening' for centuries before European settlers arrived, but this is scarcely acknowledged in the Aboriginal history of Australia (Pascoe, 2014). This is particularly relevant to the practice of gardening programmes today and emerging interest in school gardens in Aboriginal contexts.

Viola's (2006) evaluation of the Outreach School Garden Project involved Aboriginal students from two remote Queensland Aboriginal communities. Viola (2006) produced evidence that the participants increased their knowledge of nutrition and gardening over the six months period of the study as well as producing positive improvements in the physical and social environment of the school.

Research by Hume et al. (2014) conducted a pilot study aimed at determining the feasibility of a novel,

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low-cost programme to get remote schools started in gardening and nutritional activities. They found that the programme was delivered economically without the need for on-the-ground staff. This led the authors to agree that this model can be applicable to remote schools throughout Australia, where there is a need for healthier impact behaviour changes in high-risk populations. However, it appears that school gardens in Aboriginal communities with significant numbers of Aboriginal students have also enjoyed a revival as reflected in the EduGrow School Garden Awards in East Arnhem Land. These awards supported and encouraged students, teachers and schools to create food gardens and learning activities through engaging, fun activities that could be readily integrated within the curriculum (Fawcett, 2012).

This current research project draws on programmes that include traditional bush-tucker foods in SBGs. These 'food plants may be a good indicator of enhanced nutrition education, and could play a role in addressing the trend of Aboriginal peoples moving to westernised diets, albeit on a small scale' (Guitart, Pickering, & Byrne, 2014, p. 115).

Theoretical/Philosophical Approach-*Dadirri*

The philosophical approach of *Dadirri* derives from a word from the *Ngangikurungkurr* language of the *Malak Malak* people of the Daly River region of the Northern Territory. While *Dadirri* comes from *Nauiyu* country, other language groups have equivalent words to describe a similar process, such as *Gan 'na* from the *Bundjalung* people (North Coast, New South Wales) is to hear, listen, feel, think and understand. *Dadirri* is inner deep listening and quiet still awareness. It is about experiencing over a period of time in the practice or activity of 'contemplation' of deep reflective thought, to put it in a western perspective (Atkinson, 2002; Ungunmerr, 2000, 2003). West, Stewart, Foster and Usher (2012, p. 1587) explain that the *Dadirri* approach, 'at its deepest level, is the search for understanding and meaning. It is listening and learning at its most profound level, more than just listening by the ear, but listening from the heart'. The practice of *Dadirri* is 'listening with an open mind, suspending our tendency to immediately label, analyse, critique, or organise the information we are receiving. It is a more experiential approach to hearing in which we do not just hear what the voice is saying, we hear the quality of the voice itself' (O'Connor, 2015, p. 1). *Dadirri* is the necessity for personal and social interaction; interrelatedness between distant past, past, present and future in a situation or place; and spiritual or indigenality. *Dadirri* creates a respect for oneself to take the time to just listen and reflect, using awareness of being. The *Dadirri* approach is about listening, reflecting, learning and being present in the moment.

Dadirri is linked to nature and the affiliation to land as sacred. It focuses on a strong sense of community where 'all people matter' (West et al., 2012, p. 1584). It is a process of self-integration and realisation of the experiences into the life processes of the individual and community. *Dadirri* is well positioned within the context of this research study to allow processes involving participants to engage in a rich and meaningful communication with themselves, other students and the researcher.

Article 12 of the United Nations Convention on the Rights of the Child (CRC) (UNICEF, 1989) proposes that it is important to provide every child with the right to speak freely about matters that affect them; their opinion must be recognised. This right provides the background and rationale for the approach to this research. Thus, it has been designed to support participants to freely discuss their views of their SBG and what it means to them.

The methodology draws on the *Dadirri* approach of listening deeply to the participants to fulfil this transaction. From this situation, the *Dadirri* approach of listening deeply to the participants aims to produce authentic responses by the researcher to what the participants say, by genuinely listening using the tool of photovoice (Wang & Burris, 1997). This process is thus likely to reveal genuine responses to their experience in the SBG.

Using *Dadirri* as a practical perspective in research methodology enables the researcher to engage deeply with the participants involved in personal education, experiencing life and culture from a different perspective, and therefore gaining insight through a different paradigm. The study used a case study multilayered qualitative method approach employing simultaneous collection of data. This included key informants, semi-structured interviews as well as student surveys and photovoice with an unstructured interview of students involved.

Research Design

The research focuses on the meaning students give to SBGs. The process could potentially provide the participants with opportunities to develop knowledge, awareness and competencies, which they can record with their cameras in photovoice. Incorporation of *Dadirri* in the philosophical approach allows for a number of ways of drawing meaning that enables the observation of growth in life skills of the students. This allows the students to be guided by their personal contemplation in the garden and to learn to respect the garden, just through being in the garden and listening.

Using a qualitative case study and a short survey designed to find out if the students were engaged or disengaged, while they were in the garden provided by the researcher of the tools to draw from the Skinner et al. (2012) study, thus providing a broader perspective on the overall research. This is evident in the Dirks and Orvis (2005) study on the evaluation of the junior master gardener (JMG) programme in third grade students in Indiana by using qualitative and quantitative approaches to

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address formative, dynamic and summative data. This was achieved through pre–post testing using a two-part test as well as a post only survey, designed for that study. Observations were utilised to evaluate gains and attitude changes towards topics changed by the JMG curriculum, and measured in science, horticulture and the environment. Although this study does not relate directly to this research, it explores the different ways of approaching mixed methodology and clarifies that the study had to develop its own evaluation tools, drawing from a number of other studies.

The research engaged the young participants to use photovoice as an innovative and creative tool, in order to capture their view of the SBG. This allows for questions to be asked through unstructured interviews by including the use of photovoice to work collaboratively through the various stages of the research process. A qualitative lens leads to collecting data during recorded interviews that were analysed. This research allows participants to freely discuss their view of their SBG and what it means to them.

Photovoice

A photo elicitation methodology known as 'photovoice', which was first used by Wang and Burris (1994; 1997) to enable Chinese women to photograph their everyday lives, captured the students' perspectives of their SBG. Wang (1999, p. 185) explains the three main sources underpinning the technique in their action research strategy as 'the theoretical literature on education for critical consciousness, feminist theory and non-traditional approaches to documentary photography'.

Wilkin and Liamputtong (2010) used the photovoice technique to research the experiences of Aboriginal health workers because of its unobtrusive nature and the fact that it has the capacity to be empowering. Carlson, Engebretson, and Chamberlain (2006) discussed the four goals of photovoice that was developed by Wang and Burris (1997): encourage discussion around the topic, create a safe environment for discussion and reflection, help mobilise people to recognise a need for action in certain areas of their lives and allow their ideas to be disseminated to a wider community to facilitate change.

Applying this technique allowed all students to advocate and value their knowledge grounded in their experience. The effort and ownership of participation in an SBG fleshed-out perspectives of the children. Photovoice, then, was an effective tool for realising child centred research by its ability to address knowledge production and outcome-oriented results (Drew, Duncan, & Sawyer, 2010). The approach provided a thick description of themes the students derived regarding the meaning of the SBG. It has been stated 'that a picture is worth a thousand words', however it is more than that, a picture is a way of gaining insight into the 'humanness that surrounds us' (Collier & Collier, 1986 p. 1).

Photovoice is a research methodology that was used to capture children's perspective by assigning participants to go out and capture their own views of SBGs in a meaningful visual way using a small digital camera. The photographs were then used to help highlight the voices of the participants as they experience the world of their SBG. This then helped them to remember and relate those experiences.

The Overlap of *Dadirri* and Photovoice

The methodological use of photovoice provides the researcher with a picture of the students' perceptions of themselves, as they see themselves in the garden, their experiences in SBG and their insights into their personal interpretation of the SBG. Nelson and Christensen (2009, p. 37) discuss the benefit of photovoice as:

> qualitative data rounds out other student perceptions of themselves as learners, their experiences of schooling and insights onto their lives beyond school. This qualitative data rounds out other student achievement and learning process data teachers collect adding the students' voice to the portfolio of evidence that informs their planning and teaching practice. More importantly photovoice represents an opportunity for teachers to listen deeply to their students and for the students to speak about themselves and their preferences in a way that is difficult to achieve in classroom.

This links to the *Dadirri* way of deep listening. As a data collection method, photovoice engaged children confidently and would be superior to both writing and drawing as Gabhainn and Sixsmith (2006) explain. Both writing and drawing produced feelings of self-consciousness, which could lead to participants being discouraged from participating in the study.

Linking the philosophical approach of *Dadirri* with the methodological framework of photovoice and with student learning in the garden permits the student to become researchers. Students explore more fully, what they have experienced and question the origins of their understandings and feelings as they take control of how they report what they view as significant and meaningful in terms of their own view of their garden.

Data Analysis

The data has been analysed using a thematic approach of looking at the photos and analysing student responses to each of the five photos they choose. The focus research question was 'what meaning do the students give to their SBG?' In each case study school, the students' photos that were similar in content were placed together and the information of their interviews of the photos placed next to the group photo, to see if there were any similarities and the differences in themes.

This information was placed in a spreadsheet to look at the themes and subthemes.

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Conclusion

The research does not wish to dominate with theoretical perspectives but rather the aim is to access the perspectives of the participants in all the stages of the research. However, it worked especially well with the students that were involved in SBGs to have a say in what their garden meant to them. The *Dadirri* approach of listening deeply to the participants using photovoice produced realistic responses that were captured and categorised to understand the ultimate outcome of the effectiveness of SBGs. Allowing the participants to speak freely have autonomy and be respected by the researcher in what the participants said by genuinely listening using the tool of photovoice revealed open responses to their experience in the SBG. *Dadirri,* as an Aboriginal philosophical approach of deep listening, is a contemplative practice for the researcher to assist all in the project to genuinely engage with each other within the environment of the SBG.

Photovoice as a methodology is a multistage process of taking, selecting, sharing and comparing photographs taken by the student in their environment. This collective process allows the students to understand relationships between photographs, the meaning they represent and their living environment or lived experience. Each visual image and the accompanying story can promote an effective means of communicating and sharing their particular interest. This can result in individual development of alternate learning activities, and may ultimately lead to school change. The photovoice process can create a forum for deep understanding of students' democracy for representation of their voice being heard in decision-making processes. The camera allows the students to participate in the research process. Using photovoice as a tool supports the understanding, that students' development should be viewed holistically.

The aim is for the voices of the students to tell their story of their experience of what their school garden means to them. The students are the researchers and their photos are the evidence to substantiate their voice, and to give it colour, explanation and meaning. Further, it is expected that building on the analysis of the research, it will be possible to build outcomes to guide and elaborate on ways of learning in the SBG, that promote excellence and lifelong learning in areas not only associated with the core curriculum but also personal and healthy development.

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Liesa Clague is an Aboriginal woman of the Yaegl people, from the North Coast of New South Wales on her mother's side and on her father's side has Manx heritage. After 23 years as a nurse and midwife, she is currently completing her PhD at Macquarie University. Liesa worked in many areas from public to private to University to vocational education TAFE. Liesa currently resides in Sydney with her two daughters and practices her love for growing native plants, fresh herbs and fruit trees at home.

Neil Harrison is a Senior Lecturer in the School of Education at Macquarie University, Sydney, Australia. He has over 30 years of teaching and research experience in Aboriginal education, and his book *Teaching and Learning in Aboriginal Education* (Oxford) is widely used in Teacher Education programmes across Australia. His recent research centres upon developing research and teaching partnerships with Aboriginal communities, and to this end, he is developing an approach to *Learning from Country* in the city.

Katherine Stewart has research interests that centre on the facilitation of student engagement in high-quality learning. Her experience lies in teaching and researching learning in environments beyond the classroom – especially learning in outdoor environments. Kathy is currently involved in researching the use of portable computing devices to support school and community biodiversity studies. Working on a major Australian study at Macquarie University Opening real science: Authentic mathematics and science education project. Kathy is very creative and does extensive craft activities outside of work with jewellery making and felt projects.

Caroline (Carlie) Atkinson is an Aboriginal women of Jiman — Bundjalung heritage. As part of her PhD, she developed the Australian Aboriginal Version of the Harvard Trauma Questionnaire. While completing her PhD, Carlie specialising in trauma informed and trauma-specific mixed-method research and curriculum development with a focus on violence, trauma, loss and grief issues. Presently, Carlie is focused on curriculum development and research for We Al-li providing trauma informed and trauma specific programmes and activities throughout Australia and the Asia Pacific and co-ordinating study support for Indigenous students in a pathways course at the Southern Cross University.

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