School-based Community Gardens Battling Food Disconnection as a Manifestation of Environmental Generational Amnesia

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Submitted in fulfilment of the requirement for a Doctor of Philosophy degree in Society and Culture

College of Science and Engineering

Tropical Urbanism and Design Lab

James Cook University

2024

Acknowledgements

In many ways, crafting the acknowledgments section has proven to be the most challenging part of my writing journey. I believe many can relate to the initial anxious contemplation of what to say, how impactful it should be, and who to include. However, as new individuals enter your life during the PhD journey their role in shaping the thesis becomes increasingly significant. I have encountered many of these transformative moments, and many significant people. So, I will begin at the inception and strive to keep it concise. Thank you, first and foremost, for delving into what is essentially a piece of me spread across these three hundred or so pages – I hope you enjoy the reading as much as I enjoyed the creating. I was always going to do a PhD and I may be one of the very few who are sad to see it ending.

My late grandfather, Keith, was the first Dr. Walshe I knew. My father, Charles (or Charlie, or Chuck, depending on the iteration and era you knew him in), was my introduction to the world of anarchism. Though they often did not see eye-to-eye throughout my father's adult life, I like to believe that this journey has allowed me to embody the best aspects of them both. My father, a lifelong rebel against societal norms and a champion of various counter-cultures, shaped my perspective on pushing against the system. On the other hand, my grandfather, an immensely

intelligent man, utilised his greatest tool, his mind, to enhance the lives of many by working within established systems. His work in electro-engineering changed most of our lives, without most of us even knowing. He left the world a better place, just as my father continues to make the world a better place. I understand both of their lifestyles, as I value both tearing down a system and the understanding that sometimes transformation is best achieved by working from within. This thesis embodies these values as I explore the possibilities of different food futures with hope and optimism. It is my attempt at being an anarchist who strives to change the system from within.

It would be remiss not to acknowledge the massive role my partner Sasha played in shaping this thesis. He drew me out of the confines of the office, engaging with the world, gardening together, introducing me to mindfulness practices, and traversing the length of the east coast from Cairns to Tasmania. Sasha also pushed me to become a better scholar by challenging my attempts to sound intelligent with convoluted sentences that even I struggled to comprehend. Without Sasha, I would undoubtedly be a different person (I most definitely would not know I am a coeliac), and probably much more fatigued. My gratitude also extends to his parents, who consistently nurtured me when I sought refuge on their property on the Far South Coast, tired and in need of both space and time to write.

If all students could have supervisors like mine, the common narrative of supervisors being tyrants would cease to exist. Mine were, and continue to be, incredible individuals. They encouraged me to show up as my authentic self and provided unwavering support throughout what initially felt like an endless process of writing and rewriting. Lisa became akin to family, opening her home to me when I needed it most, encouraging me to push my thinking further over cups of coffee around the table. These moments are eternally cherished, and I already sorely miss them. Lisa, thank you for every single piece of hard advice you gave me and more being more than a supervisor. There is an assertion that doing a PhD is the best time in an academic career. This resonates very deeply with me as every moment has been a blend of sweetness, challenge, and confidence-building. Without Snowy, Lisa, and Nick as my supervisors, the narrative could have unfolded quite differently. I must also express gratitude to James Cook University for the research scholarship and living allowance (stipend), enabling me to set aside the (barista) tools and dedicate myself to desk work. A consistent and guaranteed income is a blessing in this generation, and I am sincerely thankful that the GRS saw potential in both me and my ideas.

Lastly, my community, both near and far, deserves profound appreciation. My family, especially my nana, thank you for always showing up – I would not be

typing on this laptop without you. Your understanding when I embarked on the PhD journey, knowing I would be around less and might miss significant life events, was unwavering. While I regret the missed occasions, especially my best friend's birthday (July 4th, right?) and graduation, your constant support filled me with confidence. I was lucky enough however, to witness my nephew's first day in the world. That was an experience which fuelled my determination to ensure he inherits a thriving world, as special as the one I experienced as a child. Another special thank you to the TNSS community for allowing me to conduct research and simply linger among you, enjoying conversations and gardening with the little humans. To my broader community, I've encountered numerous individuals on this journey, and if I could acknowledge each one, I would. Yet, I can't. Therefore, thank you to anyone who truly listened when I explained my thesis (even when I didn't fully comprehend it myself) and to those who just yarned with me in general over cups of coffee or cacao. It has been a pleasure. If, as you read this, you find yourself smiling, know that you are an integral part of my community, and to you, I am forever indebted. Games nights, themed cooking events, beach hangs, waterfall dips, snow hikes, gremlining on the dance floor, market trips, sunset walks, mountain climbs, silent meditations, weaving, climbing in general, and of course, gardening – these are the memories of the last three years, and each one is adorned

with a radiant smiling face. You are that smiling face. Thank you, I hope I can continue to relish in your smiles for a long time to come. For now, enjoy.

Statement of Contribution of Others

Nature of Assistance	Contribution (specify only those contributions that are applicable to your thesis; the list below is not exhaustive)	Names, Titles *(if relevant)* and Affiliations of Co-Contributors
Intellectual support	1. Proposal writing 2. Statistical support 3. Editorial assistance	1. Lisa Law, Neus (Snowy) Evans 2. Nick Osbaldiston (statistical support) 3. Lisa Law, Neus (Snowy) Evans
Financial support	1. Fee offset/waiver 2. Stipend: 3. Research costs: $3000	1. Australian Postgraduate Award (APA) PhD Scholarship 2. Australian Postgraduate Award (APA) PhD Scholarship 3. James Cook University College of Science and Engineering

| Research dissemination | 1. Conference bursary 2021: $900
2. Conference bursary 2022: $800
3. Conference bursary 2023: $900
4. Conference bursary 2023: $1500 | 1. Institute of Australian Geographers
2. Institute of Australian Geographers
3. Institute of Australian Geographers
4. James Cook University - College of Science and Engineering |
| Data collection | Interview design (quality assistance) | Snowy Evans, Lisa Law, Nick Osbaldiston |

Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given. Every reasonable effort has been made to gain permission and acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.

List of Research Papers from this thesis:

Paper 1 (Accepted)

Walshe, R., Evans, N. S. (Snowy) & Law, L. (2024). School Gardens: A review on the benefits and barriers. Issues in Educational Research. 32(2) (Accepted)

Author contribution credit roles

Walshe, R: Author, Conceptualisation, Methodology, Design, Analysis, Editing, Review

Evans, N. S (Snowy): Supervision, Commentary, Editing, Review

Law, L: Supervision, Commentary, Editing, Review

Paper 2 (Published)

Walshe, R., Evans, N. S. (Snowy) & Law, L. (2022). Mapping community gardens in the Australian National Curriculum: A curriculum analysis model. *Issues in Educational Research*, 32(2), 784-804. http://www.iier.org.au/iier32/walshe.pdf

Author contribution credit roles

Walshe, R: Author, Conceptualisation, Methodology, Design, Analysis

Evans, N. S (Snowy): Supervision, Commentary, Editing Review

Law, L: Supervision, Commentary, Editing, Review

Paper 3 (Published)

Walshe, Rachael, and L. Law. (2024) "Doing Research with Busy People: Enacting Rapid Walking Methodologies with Teachers in a Primary School." *Cities* 145. https://doi.org/10.1016/j.cities.2023.104707.

Author contribution credit roles

Walshe, R: Author, Conceptualisation, Methodology, Design, Interviews, Analysis, Editing, Review

Law, L: Supervision, Commentary, Editing, Review

Paper 4 (Under Review)

Walshe, R., Law, L & Evans, N. S. (Snowy). (2024) Understanding Environmental Generational Amnesia through urban school garden learning experiences in Gimuy/Cairns, Australia. *Local Environment*. (In Review)

Author contribution credit roles

Walshe, R: Author, Conceptualisation, Methodology, Design, Interviews, Analysis

Evans, N. S (Snowy): Supervision, Commentary, Editing, Review

Law, L: Supervision, Commentary, Editing, Review

Paper 5 (Decision pending)

Walshe, R., Law, L. & Evans, N. S. (Snowy). (2024). Pedagogy, place, and food education in Australian schools: Lessons from Tropical North Queensland. *Children's Geographies.* (Decision pending)

Author contribution credit roles

Walshe, R: Author, Conceptualisation, Methodology, Design, Fieldwork, Analysis, Editing, Review

Osbaldiston, N: Supervision, Statistical help, Commentary

Law, L: Supervision, Commentary, Editing, Review

Evans, N. S (Snowy): Supervision, Commentary, Editing, Review

Abstract

This thesis writes about and alongside what scholars have come to term Environmental Generational Amnesia, or EGA. The concept of EGA refers to the phenomenon that each new generation has a lower expectation of the natural environment due to reduced exposure to nature. This means that each new generation experiences a different 'baseline' environment than the one before it, leading to a gradual decline in the perceived healthy state of the environment. This decline results in millions of children now perceiving litter, regularly occurring extreme weather events, concrete jungles, and diminishing urban green spaces as 'normal.'

While EGA has amassed attention within the field of Eco-Psychology, its exploration in the context of Environmental Education and Human Geography research remains limited. This thesis is the first known to situate food origin disconnection as a manifestation of EGA by investigating urban children's relationship to both food and the environment. It does so with the understanding that children growing up in urban environments are given few opportunities to engage with their food at its source of origin – leading to a mental disconnect between farmer and urbanite. This is not dissimilar to the problem of diminishing urban green spaces and children's disassociation with the natural realm. This

research is also the first known to interrogate the role that the education system plays in mitigating or de-escalating the phenomenon of EGA and uses the vibrant social space of a school-based community garden (where food is grown) to do so. By engaging with the education system to explore the link between food origin disconnection and EGA and drawing on place-responsive and more-than-human thinking to do so, this research places EGA at the intersections of Education and Human Geography.

Due to the myriad of benefits that gardening provides, including connection to food, local ecologies, and the more-than-human realm, this research uses a school-based community garden as a potential site for de-escalating EGA. The thesis pragmatically investigates the phenomena of EGA by examining the outcomes of school gardening experiences and posing the questions: What role do school gardens play in battling Environmental Generational Amnesia and a lack of food origin awareness? Can engaging with food and place through gardening enhance food origin connection and de-escalate EGA? The research is situated in a government primary school located in the greater Gimuy (Cairns) region and is referred to as Tropical North State School (TNSS). TNSS offers two streams of education, a Montessori-method, and a traditional method. These streams apply different pedagogical approaches to teaching, which allows this research to

compare the outcomes in relation to food awareness and EGA. The objective of this research is to understand how children engage with school-based community gardens, and whether experiential/place-responsive pedagogies work to enhance children's food origin awareness.

The research utilises several data collection techniques including art-based practices, policy analyses, and interviews. The curriculum analysis examines the potential role community gardens can play within the Australian Curriculum, providing scholars and educators a way to integrate these spaces into lessons. Interviews are used to deconstruct if and how participants perceive EGA's manifestation at TNSS, and what the benefits and barriers are to school-based community gardens. Art-based practices such as drawings are used to compare the outcomes of pedagogical approaches to food education and investigate whether they have an impact on both food and place awareness. Ultimately, the empirical data collected through this research concludes that hands-on learning in the garden works to enhance food origin awareness and de-escalate EGA. The research highlights that when exposed to gardening practices children (under the age of 7) come to know both their food system and place in an embodied, sensorial way, directly de-escalating perceived manifestations of EGA.

Key words

Environmental Generational Amnesia (EGA)

More-than-human

Food

Community gardens

School Gardens

Montessori method

Place

Urban green spaces

Food origin awareness

Wellbeing

Curriculum

Pedagogy

Experiential learning

Place-responsive learning

Cairns

Sense of place

Environmental belonging

Natural Environment

Pragmatism

Acronyms

ACARA- Australian Curriculum and Assessment Reporting Authority

EGA – Environmental Generational Amnesia

HASS – Humanities and Social Sciences

HPE – Heath and Physical Education

QERI – Queensland Education and Research Inventory

STEM- Science, Technology, Engineering and Maths

TNSS - Tropical North State School

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1.1.1 Ontology

This thesis commences with a backdrop of my formative years, during which my earliest encounters with residing in a rural setting influenced my world perspectives. Growing up my family was isolated on a 100-acre property located on the edge of a conservation park, 45km outside of a town consisting of 200 people. It was a unique experience not many children in Australia have. In search of an alternative dietary lifestyle our family cultivated a vegetable garden, maintained diverse fruit trees, and raised farm animals that we nurtured and cared for. We ate seasonally, as locally as we could, and relied on learning and knowing our local ecologies to get by. Of course, we went to the neighbouring town to grocery shop for food we could not grow ourselves, but essentially – we did it ourselves – or rather, our parents did. My sisters and I played in the garden picking treats off the bean stalks and searched for ruby red strawberries hidden under the foliage. This childhood and lifestyle were not all without hardship, however, as we encountered financial and ecological challenges along the way. Adverse weather conditions, including frosts leading to crop destruction and a prolonged drought resulting in

farm failure, necessitated the eventual decision to relocate. But not without my sisters and I first knowing animals as our friends, the garden as our playground, and gaining the knowledge of where food comes from and how to grow it.

We relocated to the suburbs of Meanjin (Brisbane), Australia, when I was reaching high school age. It quickly occurred to me that my family and I had different experiences in our relationship with food and the environment than my new peers. They did not know – nor seem interested in knowing – where their food came from and had little understanding or desire to be in the bush. I remember thinking how disconnected with it all (for lack of a better word) they seemed. We, however, had been eating from the veggie patch (or trying to mostly) and raising animals to eat. We played in gullies and sometimes woke to find wild brumbies and kangaroos in our yard. We were, as everyone in the local town called us growing up, the 'bush babies' from the end of the dirt road. Moving to the city, I became aware of just how different we were.

The environmental disassociation that I witnessed in my new peers is something that I could not name for many years but has been interrogated by scholars through many lenses. In this thesis, I will use the concept of Environmental Generational Amnesia, or EGA (Kahn, 2002) to discuss this environmental disassociation. EGA acknowledges the psychological impact of our

regression from the natural environment (Kahn, 2002). As the name suggests, EGA is the successive and growing generational amnesia of what it means to exist with(out) nature, resulting in each new generation perceiving an environment that is degraded more than the last generations as normal (Kahn, 2022). This means that those growing up in the current era, in tightly packed urban areas, will view climate change, litter, nature confined to parks and median strips, and extreme environmental degradation as normal (Kahn, 2002). Scholars currently understand EGA to manifest as a lack of environmental understanding, poor moral affiliation towards non-human counterparts (insects, animals, and plants) (Kahn, 2022), limited motor skills (Kahn & Weiss, 2017) and place-disconnection (Kahn, 2002). However, just as children are not regularly engaging in nature-based experiences, they are also not regularly exposed to food-growing practices in urban areas (Cairns, 2017). This is a problem scholars already investigate (yet do not link to EGA), and one that I have personally sought to understand since relocating to the city in my youth. To understand the dynamics and interrelationship between tangible food growing experiences and enhanced food connection, this research systematically interrogates EGA's relationship to a lacking awareness of food origins.

In 2019 I relocated once again to an unfamiliar environment: Gimuy[1] (Cairns) in Far North Queensland Australia. Gimuy borders two World Heritage sites: The Great Barrier Reef and the Daintree Rainforest. It is a wet, humid, steamy tropical climate, and the environment (both built and wild) reflects this. I joined the local community garden located at the back of my university, which is located on Djabugay Country, to not only find a community – but also do what I loved and grow food. A community garden is a piece of land that is collectively maintained and cultivated by a group of individuals or a community (Lovell et al., 2014). They serve as shared spaces where people come together to grow fruits, vegetables, flowers, or other plants. They are more-than-human spaces that bring vitality (Walstra, 2021), and create connection to both community (Dolley, 2020) and the land (Baker, 2004; Kingsley et al., 2009). Community gardens are such valued, vibrant, and useful spaces that in 2023, the Queensland Labor Government released a statement and community grants scheme (up to $50,000 each) with the hopes of becoming the 'Community Garden Capital' in Australia (Queensland Government,

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[1] Gimuy is the place name for the city of Cairns and is on Walubara Yidinji Country (Cairns Regional Council, 2023). While still acknowledging the Djabugay and Yirrganydji peoples on whose country the research takes place, the term Gimuy will be used throughout this thesis as it relates to the nationally recognised place name of the city in this context.

2023). I personally have benefitted from engaging in community gardens, which is perhaps another reason behind conducting this research, for when I moved to Gimuy the community in my community garden, and the garden itself, taught me about what it means to live in a tropical place. As someone who knew how to grow food in temperate, and then sub-tropical environments, the tropics was undeniably a challenge. I was met with consistent failure in growing my own produce, choosing the wrong vegetables for the wrong season, and grew disheartened. But through interactions in the community garden with my new peers, and the plants themselves, I was slowly taught about the wet season root vegetables such as Taro, how Asian vegetables do well here, and that a lot of produce we know in the south as summer crops, only grow during the dry season in Winter in the tropics. These spaces provide opportunity to engage with place in an embodied and sensorial way.

Moving from a rural, temperate place to a suburban, sub-tropical one, and then again to a wet tropical climate changed how I interacted with the environment and nature around me. It produced a felt understanding that where we are raised, the actions we are exposed to, and the experiences we gain, shape our knowledge and worldview. I have a different world view to many of those who grew up in cities (or so I have experienced), and this is because of how and where I was raised. This understanding is what scholars would call a pragmatic view of the world (Morgan, 2014). That there is no absolute truth, everything is subjective and formed through

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experiences (Kadlec, 2006). This thesis thus rests on an ontological approach rooted in a pragmatic paradigm, depicted in Figure 1.1, understanding that knowledge is a by-product of action while also simultaneously informing our future actions (Kadlec, 2006).
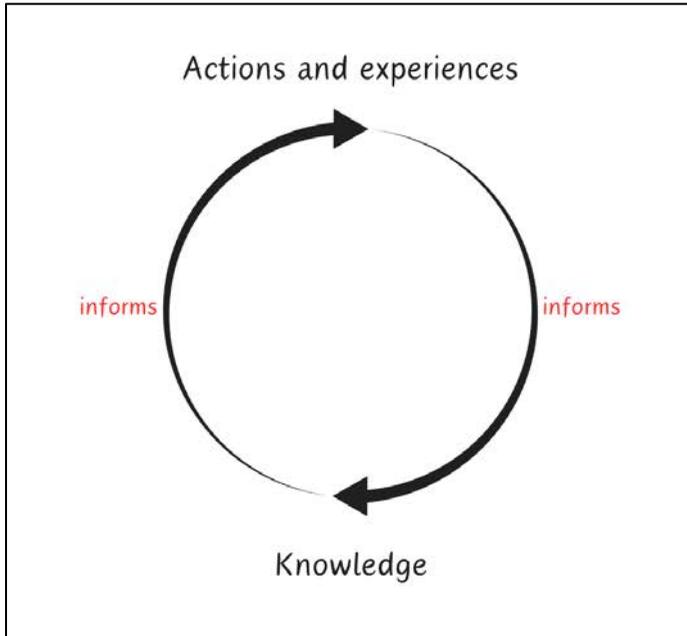
Figure 1.1: The continuous cycle of a pragmatically informed world view

The pragmatic ontology (and epistemology, explored further below in 1.2.1) used in this thesis follows the iteration of Dewey (van Dijk, 2021), who suggested that knowledge is a process of inquiry – where experience informs knowledge, as knowledge also informs experience (Dewey, 1986). My experience of a rural, temperate, and food/nature immersed childhood has informed my knowledge (or

outlook), and through this thesis I use this knowledge to understand the root of others' experiences in shaping their knowledge. Pragmatists understand that beliefs are informed from experience first, that reality is not fixed, objective, or absolute, but rather a social construction that is contingent on context, perspective, place, and experience (Morgan, 2014).

Place and more-than-human are two concepts that require defining before moving forward, as they hold importance by conceptually informing this thesis. Firstly, place is a commonly encountered word that depending on the academic field, holds a different meaning. I draw on Massey (1999), who suggests that place is defined by the emotional attachment and interactions people have with their physical locale; it is more than a geographical reference point and takes seriously the individuals who make up a place and the way they interact with it. In Education, Massey's (1999) sentiments are echoed by Maude (2020), who understands place as a concept to explore geographical boundaries, connections between the built and natural environment, and as a constructed sense of belonging. In terms of gardens as a place, Law (2019) suggests a felt understanding and connection to place can be built by tending to the natural landscape and the local environment (see also Baker 2004). By engaging with places such as gardens our emotional attachment, and understanding of the environment is enhanced. The place shapes us, which is especially evident in the tropics (Law, 2019), as well as in my lived experiences.

The second term, more-than-human, recognises the interconnectedness and interdependence of human and non-human entities in the world (Taylor et al., 2012). Gardens are more-than-human spaces where humans and non-humans converge in pursuit of a common objective (Sarmiento, 2017), working together in a collective, caring fashion. A more-than-human way of imagining the world positions the human outside of the centre and gives agency to everything around us. Gardens are the perfect *place* to explore this.

Personally witnessing EGA, although I did not know it at the time, has steered me toward exploring whether gardening as an experience in urban areas could have the same effect on environmental connection, as it did for me, on urban children. In wanting to understand whether this could be validated empirically, it made sense to look towards education and the primary school system. I chose to look towards state or government funded education as this is the most accessible and common form of education in Australia, with most children (64.5% as of 2022) attending a state-owned school (Australian Bureau of Statistics, 2023). If it is true that schools have a responsibility to contribute to the shaping of children into functioning members of society by responding to its current needs (Lavrenteva & Orland-Barak, 2015; Walshe et al., 2022), then this means that they ought to play a role in addressing food disconnection, which is an evident problem in society

(Artmann et al., 2021; Kraftl et al., 2019). This meant that I would ultimately seek the opportunity to examine local schools here in Gimuy.

School-based community gardens[2], where a garden is collectively tended on a school ground (Hardy & Grootenboer, 2013; Lovell et al., 2014), are the perfect places to investigate the extent to which gardening enhances food and environmental connection (or not). School gardens offer a unique advantage over home gardens as they provide a communal and educational setting where students can collaboratively participate in the entire gardening process (Beery et al., 2014; M. Bice et al., 2018; Blair, 2009; Bucher, 2017), which may be challenging to achieve in individual home garden settings. It was important to me to recognise that not all children would, and *could,* garden at home, but they can at school. (Anđić et al., 2020; Austin, 2022; Baker et al., 2015; Beery et al., 2014; Bice et al., 2018; Blair, 2009; Block et al., 2012; Bucher, 2017; Cairns, 2017; Christian et al., 2013). Yet no scholars have investigated the relationship between growing food in the school garden and the relationship to de-escalating or even addressing EGA. While both EGA and food origin disconnection are evident in our current society, the

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[2] School-based community gardens are referred to as many things through this thesis, including school garden, community garden, and school-based community garden. The different name in each chapter was a pragmatic choice based on what suited the journal accordingly.

research in this thesis seeks to understand whether and what role gardening at school can play in de-escalating food origin disconnection as a potential manifestation of EGA.

When considering what methodological approach to take for this research, I knew that a comparative approach (Creswell, 2020) would tell the right story. Do children who are regularly exposed to gardening in school have a deeper understanding of food origins and belonging in nature than those who do not? This question led me to investigate not only schools, but the pedagogical approaches deployed when delivering curriculum content. Pedagogical approaches are vast, ranging from explicit instruction where the teacher leads all aspects of the lesson (O'Neill et al., 2013), to immersive styles including experiential, or place-responsive pedagogical approaches. Place-responsive pedagogies respond to and work with the natural environment (Lynch & Mannion, 2021), whereas experiential focuses on a child-led approach in which learning occurs through hands-on activities (Parmer et al., 2009). I managed to find a school dedicated to using multiple pedagogical approaches (outlined in 1.1.4 in greater detail), where I could comparatively measure the difference between pedagogical approaches by examining the outcome of students' food and place connection. While the various pedagogical approaches have received a lot of scholarly attention (Brennan et al., 2021; Corntassel & Hardbarger, 2019; Etherington, n.d.; Gruenewald, 2008; Lynch

& Mannion, 2021; O'Neill et al., 2013; Parmer et al., 2009), no one (as far as I can ascertain) has compared the outcome of different pedagogical approaches within the same school in relation to food education, with regard to EGA. The following section situates this research problem within the literature, before presenting the overarching and sub-research questions.

1.1.2 Research problem and questions

The Anthropocene, understood as our current epoch, is characterised by the unprecedented impact of human activities on the geological, climatic, and environmental systems of the natural world (Lewis & Maslin, 2015). In Western countries like Australia and the United States, rapid societal progress in the post-industrial, contemporary era has resulted in the expansion of taller and wider cities, encroaching upon previously fertile agricultural lands (Vargas-Hernandez & Zdunek-Wielgolaska, 2020). Consequently, nature is increasingly confined to parks, designated as areas for recreational activities, or isolated in pockets of protected national parks that are far outside the city. The widespread disappearance of nature requires greater efforts to seek it out and experience it. This situation forms the basis of EGA, as highlighted by Kahn (2002).

As stated above, EGA has amassed attention within the field of Eco-Psychology (Kahn, 2002, 2022; Kahn & Weiss, 2017), its exploration in the context of

Education and Human Geography research remains limited. Previous studies have predominantly focused on children's understanding of nature (Kahn, 2002; Kahn, 2022) or the consequences of insufficient interaction with nature (Kahn & Weiss, 2017), without adequately addressing the role of education in mitigating or de-escalating this phenomenon. Therefore, the aim of this thesis is to fill this research gap and provide a reference point for future scholars investigating EGA. Specifically, the study will examine different pedagogical approaches (McNamara & Mcnamara, 1993) to food education, and their potential in de-escalating the pervasive issue of EGA and whether food origin disconnection could indeed be a manifestation. I aim to explore EGA at the intersection of Education and Human Geography by investigating the pedagogical approaches applied at a case study school referred to as Tropical North State School (pseudonym). The study contributes to a scholarly discussion of (re)imagining an educational system that fosters a deep connection to food, place, and nature, ultimately leading to a more harmonious coexistence with our environment.

The thesis achieves these aims by drawing on different theories and disciplines to better (re)imagine the school grounds, education, and their relationship to EGA. Place, as a theory, is drawn on to understand the role that unique environments, such as the tropics in Far North Queensland, play in fostering a felt understanding of both nature (Law, 2019) and food (Bhattacharya, 2021).

More-than-human geographies are drawn on to highlight the intersections of nature and human interactions, understanding that everything we do is influenced by our more-than-human surroundings (Ingold, 2010). Pedagogical approaches, including explicit, place-responsive, and experiential pedagogies, are dissected to understand more informed practices for food education, much like they have been to understand approaches for specialised subjects like Maths (Hadar & Tirosh, 2019), Science (Abdi, 2014), and Outdoor Education (Lynch & Mannion, 2021), or the role they play in general motor-skill and emotional/social development (Marshall, 2017). I use place and more-than-human theories to situate gardens as powerful outdoor classrooms, and an understanding of pedagogical approaches to help position my answers to the following Research Question: What role do school gardens play in battling Environmental Generational Amnesia and a lack of food origin awareness? And the sub-questions:

1. Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?

2. What are the benefits and barriers to using school-based community gardens, and how can the barriers be alleviated?

3. How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?

4. How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?

5. How does gardening help to address the phenomena of EGA?

1.1.3 Research aim and objective

The aim of this research is to understand what role school-based community gardens play in de-escalating EGA and enhancing the association of food with nature in children under 7 years of age. The objective of this research is to understand how children engage with school-based community gardens, and whether experiential/place-responsive pedagogies work to enhance children's food origin awareness. To achieve this objective, this PhD-by-publication disseminates research-based findings via peer-reviewed journals and direct communication with interested parties (such as meetings and public talks with the school community).

1.1.4 Research context and location: Tropical North State School

The study location for this thesis is set in the northern reaches of Gimuy Tropical North Queensland, Australia, which can be seen in Figure 1.1. While the location will be referred to as Gimuy throughout the remainder of this thesis as that is the given place name of the city itself, the research occurred on Djabugay and

Yirrganydji country (Cairns Regional Council, 2023) and I pay my deepest respects to the traditional custodians of these lands, who existed here building and maintaining a connection to the land long before both the case study school and myself were here. The weather in Gimuy is something that defines the place (Bohnet & Pert, 2010; Law, 2019) and as such requires introduction. Gimuy, as previously mentioned, is in the wet tropics' region of Australia, sitting in the global tropical belt, and experiences two distinct seasons throughout the year – wet and dry. Through the months from December to March Gimuy is exposed to a monsoonal trough that brings with it wet, hot, and humid weather, as seen in Figure 1.2.
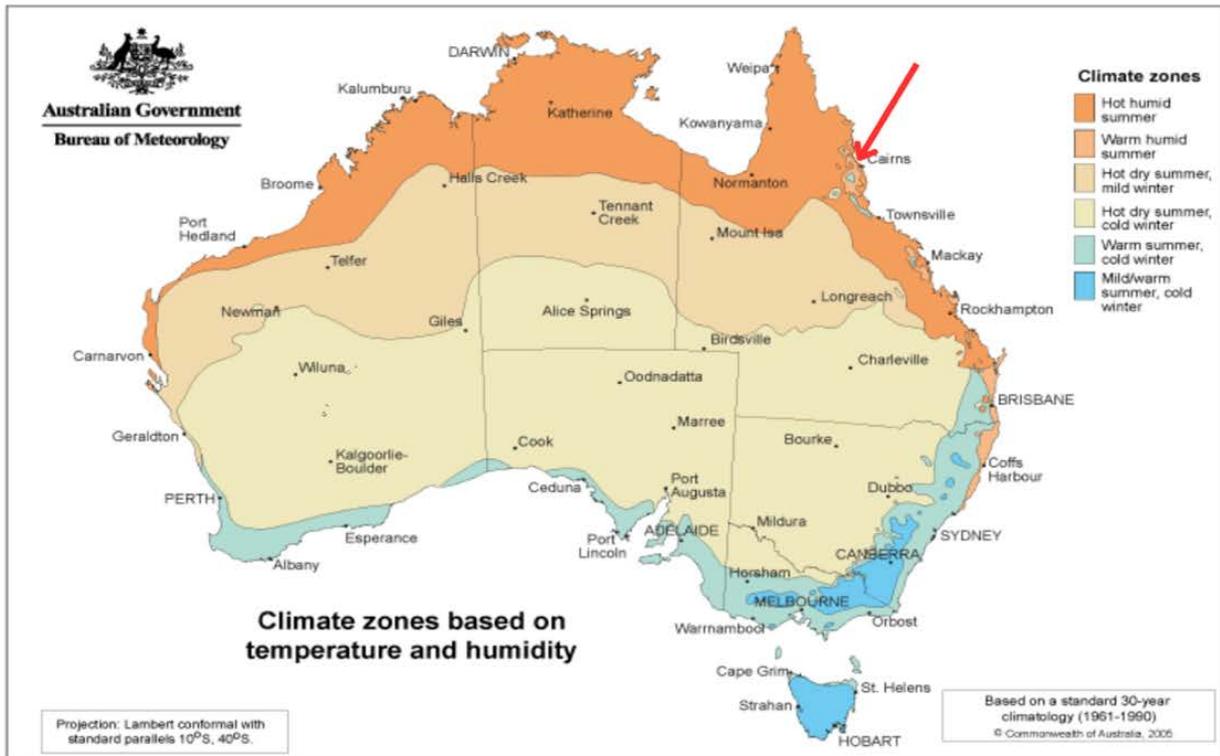
Figure 1.2: A depiction of the distinctive climates in Australia Sourced from the Bureau of Meteorology (2016).

The monsoonal time of year is also known to bring both storms and cyclones. May through to October is predominately dry and has little rainfall (Bureau of Meteorology [BOM], n.d.) and in local Yirrganydji terms, is known as the hot and cool dry time (see Figure 1.3). The months in-between these distinct seasons can be more irregular and windier and are subject to vary year-to-year. This climate is different too much of Australia and is considered, by many, to be more extreme (Law, 2019).

Figure 1.3: A depiction of the Yirrganydji calendar of the local seasons. Sourced from the Bureau of Meteorology (2016)

Though the wet tropics surrounding Gimuy are classified as World Heritage listed forests, this landscape has also seen an onset of rapid urbanisation since the early 2000's, which can be seen in Figure 1.4. This destruction of the natural environment to make way

for urban sprawl is just one reason that Kahn (2002) suggests EGA exists. As can be seen, the primary school investigated in this thesis, Tropical North State School (TNSS [pseudonym]), serves a large catchment area that has seen diminishing wild green and agricultural spaces for the sake of urban expansion. The catchment area, the locale around a government funded school which students are expected to attend unless they opt for a private or non-government education, is highlighted by the white border in images 1-4 in Figure 1.4.

Figure 1.4: Four satellite images of the TNSS catchment region from 2002 to 2022, showing the development undergone in the region in the last two decades. Sourced and adapted from Google Earth (2023)

Only two-thirds of families with primary school-aged children in the catchment area of TNSS, lived in Gimuy (or even Queensland) in 2021[3]. As seen in Figure 1.5, children and their families come from all over Australia and the world. This means that one-third of students within the TNSS catchment region, who potentially attend the school, are from a location with an entirely different felt sense of place inclusive of weather patterns, landscape, and general climate. As the children and their families who have relocated to Gimuy might be like myself and have no conceptual understanding of what the tropics really are, I use this thesis to highlight the importance of both place and place-responsive pedagogies when delivering curriculum content – and how beneficial they may be in combatting the phenomena of EGA.

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[3] Due to ethics and privacy requirements, these suburbs cannot be named as it will threaten the anonymity of the primary school and the students and staff who attend and work there.

Figure 1.5: Residence of families who relocated to the Tropical North State School catchment area 1 year before census (2021) from the ABS 2021 Census
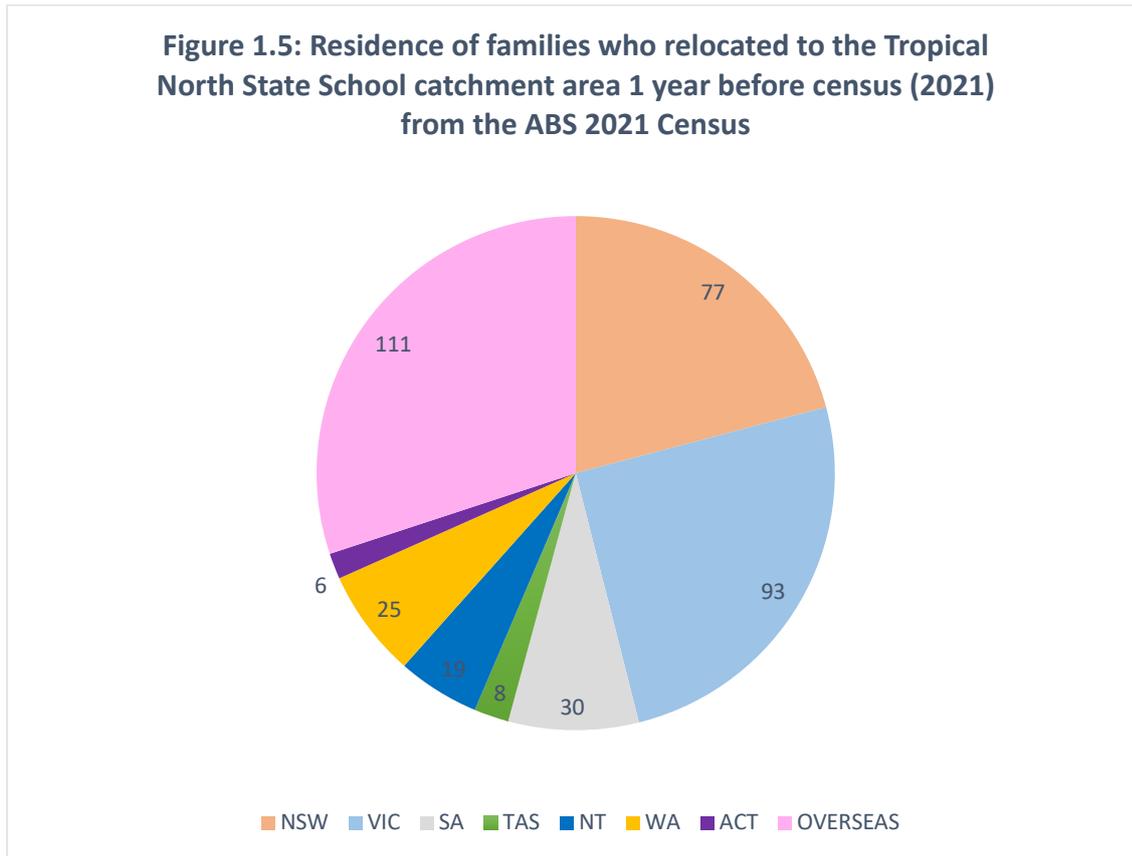
Figure 1.5: Residence of families who relocated to the Tropical North State School catchment area 1 year before the census in 2021. Interpreted data from the Australian Bureau of Statistics, 2021

TNSS presents a unique opportunity for comparative pedagogical research. This government-funded primary school features two distinct learning streams. The first stream primarily employs explicit instruction pedagogy, which aligns with the traditional teaching approach in Australia. Throughout this thesis, this explicit instruction stream will be referred to as either the traditional stream, or the explicit instruction stream. In contrast, the second stream adopts Montessori pedagogical methods, emphasising experiential and place-responsive pedagogies. Throughout this thesis it will be referred to as the Montessori or experiential stream. The Montessori stream is affiliated with Montessori Australia, the peak

organisation for the internationally renowned Montessori educational philosophy established by Maria Montessori over a century ago (Marshall, 2017). Montessori schools are generally privately owned and not funded by the state government (Montessori, 2022), positioning TNSS as a unique study location. In this context, TNSS offers an opportunity to delve into the functioning of diverse pedagogical approaches within a government educational setting. As one of six state-funded schools that incorporate the Montessori method learning stream (Montessori, 2022) alongside traditional explicit instruction, it allows for a comparison of the educational outcomes resulting from distinct pedagogical methods employed in children's education. It is also important to acknowledge, however, that parents with alternative or progressive educational ideologies are more likely to enrol their children in the Montessori stream at TNSS, drawn to its 'child-led' and 'nature-based' learning methods (Feez, 2013).

TNSS boasts many opportunities for students to engage in gardening activities, where each vegetable garden on campus is outlined in Figure 1.6. The Montessori section of the school uses its own private garden (Montessori vegetable garden) to deliver curriculum content for one full day each week. The garden sits outside of their classroom and is always accessible, making it easy to deliver Maths, English, Science, Humanities and Social Sciences (HASS), and The Arts or Technologies in the garden.
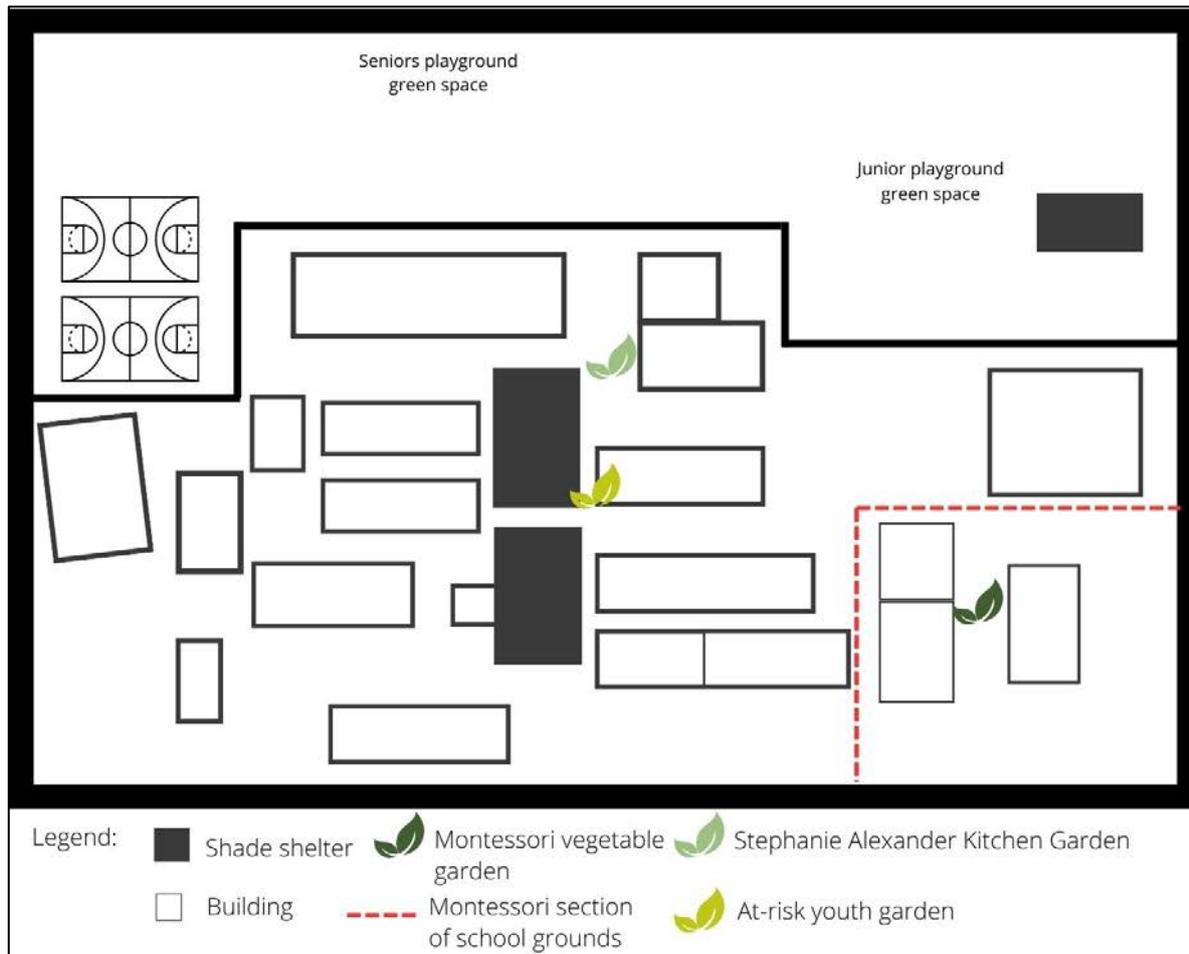
Figure 1.6: A rough representation of the TNSS school campus with the various gardens highlighted and the division between the Montessori section of the school and the rest of the school

TNSS also has a program for their at-risk or disadvantaged youth, where they engage in building and running their own garden space on campus. This is a separate school garden from the Montessori Garden and is more central to the school campus. The at-risk youth spend time engaging in their garden when classroom learning becomes difficult for them, or when they are distracting other students. Another type of program that TNSS offered at the beginning of conducting my research was the *Stephanie Alexander Kitchen Garden Program,* which was delivered by the Technologies teacher and was new in the school. This

program differed from the Montessori stream and used outsourced materials developed by Stephanie Alexander, instructing children in growing and cooking skills to increase nutrition and food knowledge. The Stephanie Alexander Garden eventually became the space where a teacher and myself, as volunteers, started a volunteer lunch-time gardening club with the children once a week.

1.2: Research methodology and thesis outline

1.2.1 Epistemological and methodological approaches

The epistemological and methodological approaches for this thesis are rooted in a pragmatic, mixed methods framework (Creswell, 2020). The research is transdisciplinary in nature and sits in the peripheries of both Environmental Education and Human Geography disciplines. Dewey, an education scholar who shaped emergent pragmatism (where both epistemology and ontology feed one another [van Dijk, 2021]), recognised the need for scholars to perform research as a process of inquiry to progress society (Dewey, 1986; Kadlec, 2006). Therefore, a pragmatic epistemological approach requires adaptability, flexibility, and an acceptance that research will change and morph along the way (Onwuegbuzie & Leech, 2005). Many of the research methodologies used in this thesis were developed and designed based on the needs of the participants (explained in Chapters 4 and 6) resulting in them changing and morphing as the research process unfolded. The methods were built from the ground up and shifted according to the situation.

To be a pragmatic researcher means to accept that every problem or situation requires its own process of inquiry, as the reality of every situation is different. The research in the thesis reflects this notion by responding to global issues such as EGA, and whether

and how it affects children's relationships with place and food. Pragmatism also means conducting research that employs the best methods for the individual situation and rarely follows expected conventions (Farrow et al., 2020). As an example, the literature review for this thesis was conducted last. It was only after conducting the research that I definitively understood the specific gap in the academic literature, a void that my literature review could fill. Moreover, the thesis has no discrete methodology chapter, as *various* methods were used in each paper. Not having a discrete methodology chapter for an entire theses worth of research is not an unexpected approach to compiling a pragmatic, mixed methods thesis-by-publication (Onwuegbuzie & Leech, 2005). Instead, each paper addresses one aspect of the overall Research Question and stands alone as a contribution to knowledge. In the following section I will briefly outline the flow of the thesis, before providing an overview of the methodologies deployed within each chapter (which addresses the lacking methodology chapter). This section is organised into chapter overviews, which reveal the breadth and diversity of methods used within the thesis. Each section will further break down the methods chosen and why, highlighting how they were useful in collecting data to answer their respective Research Questions. Lastly, each individual chapter overview will underscore any significant findings the methods yielded.

1.2.2 Thesis outline

This section outlines the structure of the thesis, highlighting the methods used for each phase and chapter, as well as the significant findings and relationships between chapters. Figure 1.7 is a visual representation of the flow of the thesis and will be repeated throughout to emphasise the journey. It is used as a visual aid to remind us of where we are in the

thesis, and where we are going. This visual aid is particularly useful as each chapter

presented in this thesis has been formatted as a journal article and were written according to

the discipline styles they align with. For example, Chapters 2 and 3 are both embedded in

the Education discipline, and therefore align with the conventions of academic language in

this discipline, whereas Chapters 4, 5, and 6 are positioned within and across the Human

Geography discipline and therefore reflect the conventions Geographers use.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

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Figure 1.7: Flow chart of the thesis outline, with the corresponding Research Questions colour coded to the according Research Questions

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1.2.3 Chapter overview

The literature review in Chapter 2 explores the advantages and challenges of incorporating community gardens into school curriculums and grounds. Chapter 2 addresses Research Question 2: *What are the benefits and barriers of using school-based community gardens?* by drawing on previous scholarly research. The review follows a similar approach to Guitart et al. (2012), utilising both qualitative (thematic) analysis and quantitative (categorisation) methods to analyse journal articles. The thematic review highlights that school-based community gardens offer benefits such as academic improvement, environmental connection, and enhanced well-being (both physical and emotional) for students. However, it also identifies time constraints, funding limitations, and difficulties in integrating gardens into the curriculum as the main barriers. Chapter 2 concludes by discussing the factors contributing to the success of school-based community gardens and providing practical solutions to overcome the barriers. Chapter 2 conforms to the pragmatic epistemological approach as it was created based on my real-world experience and challenge of not being able to find a current review for the benefits and barriers of gardens in schools.

Chapter 3 explores the explicit and implicit mentions of gardens in the Australian Curriculum and aligns them with content area descriptions and goals. In doing so, it provides an answer to Research Question 3: *How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?* Drawing inspiration from Lavrenteva and Orland-Barak (2015) and Soutter et al. (2012), the chapter presents an innovative interdisciplinary approach to analysing curriculum. Curriculum documents are densely written, and relatively inaccessible to those outside of the Education discipline. The methodology combines qualitative and quantitative methods to identify and

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address a gap in curriculum analysis models, making the curriculum more accessible for researchers who sit outside of the Education field, such as Human Geographers. The data reveals that school-based community gardens align with the goals of the Australian Curriculum, particularly in Humanities and Social Sciences (HASS) and Health and Physical Education (HPE). Chapter 3's significance lies in providing practical insights into the way school-based community gardens can be used to effectively deliver the learning goals of curriculum content, while connecting children to food systems and place.

Chapter 4 draws on novel data to answer *Question 2: What are the benefits and barriers of using school-based community gardens?* The chapter combines more-than-human witnessing (Lynch & Mannion, 2016), with walking interviews (Lynch & Mannion, 2016), and free-listing (Brewer, 2002; Quinlan, 2018) to deliver both qualitative and quantitative data. This approach is a novel methodology that allowed an investigation into teachers' own perceptions of the benefits and barriers to gardens in the context of TNSS. The methodology in Chapter 4 reflects the pragmatic paradigm as it was developed because of, and attends to, the needs of the participants (Onwuegbuzie & Leech, 2005). The chapter extends the concepts introduced in the literature review (Chapter 2) by highlighting staffing ratios, weather, and time as major barriers to school-based community gardens. It also emphasises the positive aspects that greenspaces such as gardens provide, such as the positive impact on teachers' mental well-being (not just the students) and the provision of joyful and calming activities that enhance academic outcomes for students. The significance of Chapter 4 lies in both the methodology, and by substantiating the findings of the literature review in real-world, place-specific contexts, shedding light on the benefits and barriers of gardens beyond the student population.

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Chapter 5 investigates the manifestation of EGA and its influence on food origin awareness at TNSS and as such, provides an answer to Research Question 1: *Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?* It considers the school's location in Gimuy and uses semi-structured interviews to engage with parents, teachers, the principal, groundskeeper, teacher aides and school counsellors/youth support workers to understand their experiences and perceptions of children's interactions with gardens and nature. The participants perceptions align with the current understanding of EGA manifestations, suggesting EGA is indeed a phenomenon affecting the children at TNSS. The significance of Chapter 5 lies in exploring whether EGA also manifests as food origin disconnection and its' presence at TNSS. The results highlight the role school-based community gardens can play in addressing EGA as food origin and place disconnection, promoting environmental awareness, and cultivating a felt sense of place among students. The discoveries in Chapter 5 provide the rationale for further exploring children's perceptions of food origins in Chapter 6.

Chapter 6, the final empirical findings chapter, provides insights into how experiential/ place-responsive pedagogies delivered using the garden enhance food system awareness and place connection. It focuses on children's understanding of the concept of "food" and the impact of experiential and place-responsive pedagogies on their recognition of the natural world through food experiences. Chapter 6 utilises the child-centric research method of free drawing (Goldner et al., 2021) and thematic analysis (Anning & Ring, 2004) to dissect their drawings and produce both qualitative and quantitative data. The chosen methodology prioritises the needs of children, ensuring ethical considerations and avoiding

power imbalances in the researcher-child relationship (Cutter-Mackenzie & Edwards, 2013). The findings reveal that school-based community gardens, combined with experiential/place-responsive pedagogies, improve children's recognition of local foods, and deepen their sense of place. Again, this research methodology conformed with the overarching pragmatic paradigm by ensuring the methods were selected based on their appropriateness for the situation. It also only occurred because of the perceived manifestations of EGA at the school from interview participants in the previous phase. In understanding that EGA might indeed be present, I needed a way to investigate children's relationship to food from their own perspectives, without creating a power imbalance that can occur in interviews. While some scholars believe interviewing children is an appropriate methodology, I take the stance (alongside authors such as Anning and Ring [2004]) that drawings enable children to effectively communicate their understandings without being persuaded by myself as a researcher.

In conclusion, the research conducted in these chapters significantly contributes to our understanding of EGA from a place-based perspective and the importance of mitigating, or de-escalating it, through school-based community gardens. The findings shed light on the benefits of incorporating community gardens into curriculums, such as enhancing academic outcomes, fostering environmental awareness, and promoting a sense of place and belonging among students. By addressing the barriers of time, funding, and curriculum integration, these studies offer practical solutions to overcome challenges to implementing school-based community gardens. The findings reveal EGA can also be viewed or perceived as a phenomenon that disconnects individuals from their food origins and erodes environmental connection and stewardship. Through experiential and place-responsive pedagogies using

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the school-based community garden, schools can play a pivotal role in cultivating a generation of children who are aware of their food origins and have a sense of place and belonging in their (natural) environment. These findings are the first to empirically link food origin disconnection to EGA and explore effective avenues of de-escalating it in the garden. Moreover, these insights are valuable for future scholars seeking to understand the role of school-based community gardens in addressing the real-world phenomenon of EGA and provide a pathway to begin exploring it in different places.

1.3: Research outcomes and contribution

1.3.1 Contribution

TNSS was specifically chosen as the research site to investigate the impact of pedagogies, school gardens, and the phenomenon of EGA due to the two education streams it offered (with differing pedagogical approaches). The research-based results demonstrate the presence of EGA, and while most of the findings are grounded in the specific place-based context of TNSS, they have broader implications that can be translated to schools in other settings, such as opening the opportunity to investigate EGA and place relationships in temperate climates or even in inner-city schools. The thesis expands on Kahn's (2002) theory of EGA by establishing a direct link between a lack of food origin awareness and the manifestation of EGA. Additionally, it highlights the significant role that school gardens can play in mitigating EGA by enhancing food origin awareness and connection to place. These research outcomes have been disseminated through a series of peer-reviewed or submitted

journal articles[4] and conference presentations contributing to the body of knowledge in the Human Geography and Environmental Education field:

1. Walshe, R., Evans, N. & Law, L. (2023). School Gardens: A review on the benefits and barriers. *Issues in Educational Research.* (Accepted)

2. Walshe, R., Evans, N. & Law, L. (2022). Mapping community gardens in the Australian National Curriculum: A curriculum analysis model. *Issues in Educational Research*, 32(2), 784-804. http://www.iier.org.au/iier32/walshe.pdf

3. Walshe, Rachael, and L. Law. "Doing Research with Busy People: Enacting Rapid Walking Methodologies with Teachers in a Primary School." *Cities* 145 (February 1, 2024): 104707. https://doi.org/10.1016/j.cities.2023.104707.

4. Walshe, R., Law, L & Evans, N. (2023). De-escalating Environmental Generational Amnesia in an urban school garden in Cairns, Australia. *Local Environment.* (In review)

5. Walshe, R., Law. L & Evans, N. (2023). Pedagogy, place, and food education in Australian schools: Lessons from Tropical North Queensland. *Children's Geographies.* (Decision pending)

The overall outcomes of this research are presented and discussed within each individual publication and then as a whole in Chapter 7.

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[4] Each of the included journal articles have been edited for continuity purposes. The figure titles, section headings, and table titles have all been altered to ensure they correspond with the overarching chapter they fit within.

1.3.1 Recommendations

While each paper contained within this thesis has implications and some contain their own set of recommendations regarding specific findings, there are two key recommendations made overall. This research highlights the importance of using school-based community gardens as urban greenspaces that immerse children in hands-on environmental education in an experiential/place-responsive manner. Therefore, the key recommendations are to first, increase funding available for Queensland Education to allocate resources for every primary school within Queensland to build upon, improve, or start a school-based community garden. This would align with the Queensland Labor Governments wish to become the community garden capital of Australia, creating an additional 927 gardens in the state. The second is to engage with academics, educators, and community members in building a Queensland Education-endorsed school garden work and guidebook. This guidebook ought to draw on academic findings and have both set-up and establishment protocols, information for principals and educators, class activities that align with the curriculum, and suggestions on adapting it to suit the diverse local environments represented in Queensland. These recommendations are discussed in detail in Chapter 7 in section 7.4.

Chapter 2.0: Literature Review

While undertaking this research I remained steadfast in wanting to understand and communicate the realities of school-based community gardens as best as possible. This felt important should I know how, and whether, they work in primary schools. I had some knowledge going into the research that they received high praise, and yet every time I spoke to a teacher, parent, or others involved in the primary education system the same narrative kept occurring, 'oh my school had a garden, but it's not running anymore,' or 'our school has a garden but it's all weeds now.' These sentiments kept popping up when I would engage in conversation about what my research was about. So, early on, I decided to explore the benefits and barriers of school-based community gardens, and accurately capture what is working and what is not. Figuring that this knowledge would ultimately help me make my major recommendations at the end of the thesis. However, while conducting my interviews with teachers, parents, and others at the study location TNSS and attempting to correlate their answers with the literature, I found that there was no up-to-date synthesis and exploration of the benefits and barriers.

The landscape of school gardens has evolved since the last comprehensive review conducted by Blair (2009), over a decade ago. While subsequent reviews have emerged in the years since 2009, many have centered on specific niche aspects of the topic. Blair's call to address the barriers of school gardens remains pertinent today (2009, p. 35), as such, this review seeks to delve deeper into these challenges and proposes potential solutions. My objective with this review is to create a unified reference point that outlines both the benefits

and barriers associated with gardens in educational settings, catering to scholars, educators, and other stakeholders interested in this domain.

In this chapter I explore the benefits and barriers of school-based community gardens presented across literature and unpack what the best solutions might be to overcome the challenges. In doing so, this literature review addresses Research Question 2: *What are the benefits and barriers to using school-based community gardens, and how can the barriers be alleviated?* And its relationship to the rest of the thesis, is represented in a visual map in Figure 2.1.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
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Figure 2.1: An overview of the thesis structure highlighting what Research Question (in this case RQ2) the chapter is responding to

The following work is an edited version of an accepted manuscript under: Walshe, R.,

Evans, N. S. (Snowy) & Law, L. (2023). School Gardens: A review exploring the benefits

and barriers. *Issues in Educational Research*. 34(2)

2.1 School gardens: A review exploring benefits and barriers

School gardens must overcome a range of challenges to be successful but are
often lauded for fostering hands-on education and real-world learning. This
thematic literature review synthesizes 22 journal articles and two book chapters,
extending on previous reviews by amassing their themes into one singular
reference point for scholars, while simultaneously exploring ways to overcome
the challenges associated with school gardens. Findings highlight that academic
enhancement, environmental connection, and enhanced wellbeing (both
physical and emotional) are the main benefits of school gardens, while the main
barriers are time, funding, maintenance, and curriculum integration. Strategies
for overcoming the challenges of garden spaces in educational contexts are
identified which will be valuable to scholars and others seeking to establish and
maintain gardens in schools.

Keywords: school gardens, wellbeing, environmental connection, challenges,
education

Introduction

School gardens provide valuable and opportune spaces for children to engage with the natural environment and learn. However, they are often hindered by significant barriers, including time constraints (Bucher, 2017), demanding curriculums (Christensen & Wistoft, 2019), and limited financial resources for additional expenses (Plaka & Skanavis, 2016). This literature review acknowledges the importance in recognizing school gardens' potential challenges and beneficial values. Thus, we aim to address the following questions: 1) What are the benefits and barriers to school gardens? And 2) How can barriers to school gardens be alleviated? By consolidating and extending on the various themes explored in existing literature on school gardens, this review serves as a comprehensive resource for future scholars. The last review to clearly explore the benefits and barriers was by Blair (2009), over a decade ago. As the field has moved forward and continued to gain interest and traction from the scholarly world, we wonder if much changed. While there are many reviews since 2009, they focus on niche topics. Our objective is to create a singular reference point for scholars, teachers, and others interested in this area, to understand the significant benefits of gardens in schools, the barriers, and how to alleviate them. As such, our paper provides a valuable discussion to the literature on school gardens.

Despite an abundance of papers exploring school gardens (Burt et al., 2018; R. Datta, 2016a; Hardy & Grootenboer, 2013b; Hinton et al., 2018; Hoover et al., 2021; Malberg Dyg & Wistoft, 2018), existing reviews often lack a holistic understanding of both the benefits and the barriers to implementing such spaces. Those that explore either lack clarity in defining barriers or place too much emphasis on the benefits, resulting in an uneven overall understanding of the field (Ohly et al., 2016). Other existing reviews tend to

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focus on the use of school gardens within niche areas such as mathematics and science curriculum integration (Monferrer et al., 2022), emotional development (Lohr et al., 2021), health and wellbeing (Holloway et al., 2023; Ohly et al., 2016), or physical health (Huelskamp, 2018). The lack of focus on the barriers to school gardens is disheartening because it creates a major hinderance to the success and longevity of these spaces. If the barriers to school gardens were more clearly defined and understood in literature, scholars might be better prepared to explore their points of contention, or shortfalls.

Our review includes seven review papers focusing on school gardens. Of these, three specifically focus on the benefits of school gardens, with two of them having a narrow focus on niche areas like mathematics and science curriculum integration, or health outcomes (Holloway et al., 2023; Monferrer et al., 2022). The third paper provides a broader examination of all advantages of school gardens (Blair, 2009), but is now dated and limited in scope by its focus on the United States. Three additional reviews discuss both challenges and benefits of school gardens, but have a limited focus on subject integrated learning (Christensen & Wistoft, 2019), the social and emotional impacts of gardens (Lohr et al., 2021), and their contribution to health and well-being (Ohly et al., 2016). A single review concentrates explicitly on the challenges faced when integrating gardens into schools, but it is from the perspective of using gardens as spaces of learning for emotional well-being, healthy eating, and physical health (Huelskamp, 2018). As such, it overlooks the diverse range of logistical challenges gardens face, such as limited time for maintenance (West, 2022), or a lack of institutional support (Plaka & Skanavis, 2016). By simply brushing over the barriers to school gardens, existing reviews are missing the opportunity to communicate

valuable insights. In the following will we present the methods used for conducting our review.

Method

This literature review draws on the method used in Huelskamp et al.'s (2018) systematic assessment to set parameters and criteria for what literature could be included. While not as well-known as the PRISMA method, leveraged by other scholars in the Education field (e.g., Oo et al., 2022), our review was intentionally guided by Huelskamp et al's (2018) method for the same topic. We include peer reviewed papers and book chapters published since 2010, focusing explicitly on school gardens in primary schools (grey literature was not included). The search strategy used Boolean functions. The search string '"community garden" OR "school garden" AND "school" AND "benefit" AND "barrier"' set the parameters for searching Google Scholar, Education, Scopus, Informit A+ and GREENFile. The databases reflect the two relevant disciplines of Environmental Education and Human Geography, and the search words cover the narrow scope of this review: the benefits and barriers to school gardens. Only literature published after 2010 is included in our literature review as earlier research was covered in Blair's (2009) seminal review (see also Huelskamp, 2018; Ohly et al., 2016).

Unlike other reviews in this field (Huelskamp, 2018; Lohr et al., 2021; Ohly et al., 2016), the methods used for each study are considered irrelevant. Both qualitative and quantitative methodologies produce valuable data (Daniel, 2016; Leung, 2015), capable of contributing multiple understandings to the benefits and barriers of school gardens. For example, qualitative work often helps scholars understand the social parameters surrounding

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a phenomenon (Onwuegbuzie & Leech, 2005), and quantitative research is grounded in replicable evidence (Daniel, 2016). The method is outlined in Figure 2.2, which depicts the steps involved in retaining and disqualifying research.
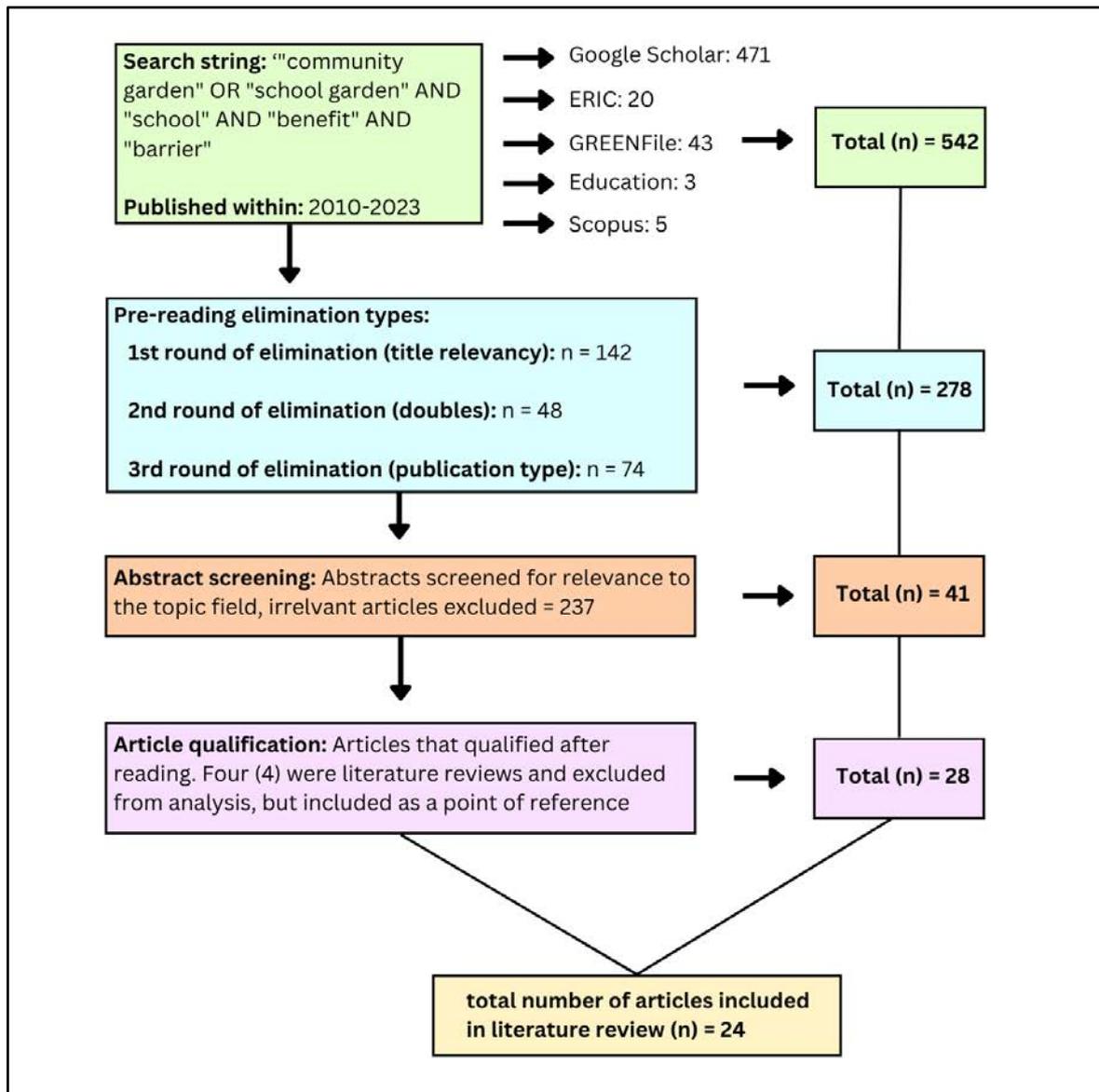
Figure 2.2: The methods used to eliminate and retain the literature

The literature retained for review was organized by: title, author and year, method, location (country and region), benefits, and barriers. Identifying benefits and barriers followed techniques used by Soutter et al. (2012). First, explicitly mentioned benefits and barriers were recorded, followed by implicit themes. As an example:

Student wellbeing in the gardens appears to be associated with being outdoors and experiencing social interaction with peers, garden educators, and teachers offering them opportunities to participate actively in the garden activities (Malberg Dyg & Wistoft, 2018, p. 1188)

This quote can be coded explicitly under the theme of well-being and can also be thematically (implicitly) coded under the theme of community due to the diverse range of social interaction opportunities provided by the gardens. This paper was coded under both wellbeing *and* community. This technique was used because it provides clear instruction and a sound methodological approach to exploring literature (Soutter et al., 2012). The next section explores the most frequent benefits and barriers of school gardens after providing an overview of the literature.

Overview of literature

This section provides an overview of literature that met the inclusion criteria, highlighting the methods and geographical scope of research included.

Following, we will begin to present the benefits of school gardens. Most of the research occurs in the United States (11), followed by Australia (4), Europe (3), Canada (2), Ireland (1), New Zealand (1), England (1), Cuba (1), and Bangladesh (1). This suggests that the benefits and barriers explored here mostly relate to school gardens in the post-industrial West.

Researchers use different methods and methodologies to gather data regarding school gardens. Most used qualitative data collection techniques (12), with interviews being the most common. Mixed methods approaches were favored (5) over studies that used purely quantitative methods (3). The lean towards qualitative data collection techniques differs from a decade ago when Blair (2009) conducted her review, when quantitative design studies were the most prevalent across school garden literature. There also tended to be less 'pre and post program' reviews, which were common amongst the literature reviewed by Blair (2009).

Interviews were the most heavily relied on data collection technique and were especially prevalent with teachers as a first point of call for data collection. The interviews seemingly tell a rich narrative and yield valuable insight into the barriers of school gardens. Another method that was generally used to bolster interviews was observations, which in our opinion, are a valuable technique. Scholars who used observation as a form of witnessing were able to examine and corroborate teachers' experiences in real time, extracting more detail than their

participants may have provided when recounting from memory during interviews (Malberg Dyg & Wistoft, 2018). In terms of the diversity of methods deployed, scholars drew on autoethnography (Datta, 2016), photography (Austin, 2022), focus groups (Huys, De Cocke, et al., 2017), policy review (Viola, 2006) and surveys (Hinton et al., 2018).

The benefits of school gardens

School gardens have long been explored for the benefits that they pertain. Figure 2.3 highlights the diverse array of benefits and depicts how often they occurred in the form of a bar chart. The most encountered themes were wellbeing (emotional) and academic benefits. Figure 2.4 (parts a, b, and c) extends this by further breaking down reoccurring themes into individual categories while also organizing the data by author. These overarching themes shape the discussion of the benefits of school gardens presented below.
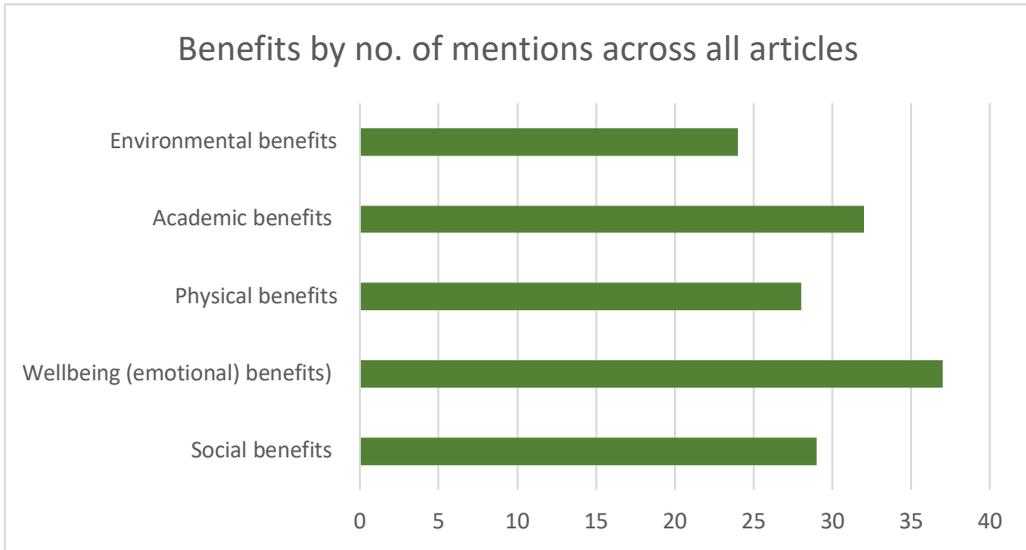
Figure 2.3: The main benefit themes and their frequency of mention across the literature

Author	Social Benefits				Wellbeing (emotional) Benefits					
	Teamwork	Engagement	Diversity	Community	Self-reliance	Self-esteem	Resilience	Empathy	Behaviour	Confidence
Austin	✓	✓		✓					✓	
Baker et al.										
Bice et al.				✓						
Bucher				✓	✓		✓			✓
Burt et al.										
Cairns				✓						✓
Carlsson et al.				✓	✓			✓		
Castro et al.				✓	✓	✓	✓			
Chawla et al.	✓			✓	✓	✓	✓		✓	✓
Datta			✓	✓	✓	✓	✓			
Day et al.		✓		✓					✓	
Greer et al.			✓	✓						
Hardy and Grootenboer		✓	✓	✓	✓	✓			✓	✓
Hinton et al.										
Hoover et al.										
Huys et al.										
Loftus et al.										
Malberg Dyg and Wistoft	✓			✓		✓		✓		✓
Nowak et al.				✓	✓					
Passy	✓	✓		✓	✓	✓			✓	✓
Plaka and Skanavis		✓							✓	
Reis and Ferriera		✓		✓	✓			✓	✓	
Wake and Birdsall		✓			✓				✓	

Figure 2.4a: Social and wellbeing benefits of school gardens

Author	Physical benefits					Academic benefits			
	Motor skills	Phys. activity	Obesity	Fruit and Veg ID	Healthy eating	Spontaneous	Hands-on	Knowledge	Curric. development
Austin								✓	
Baker et al.	✓	✓	✓					✓	
Bice et al.		✓	✓	✓				✓	
Bucher	✓	✓			✓		✓	✓	✓
Burt et al.									
Cairns	✓			✓					
Carlsson et al.				✓	✓				
Castro et al.				✓	✓				
Chawla et al.									✓
Datta					✓	✓	✓	✓	
Day et al.					✓		✓	✓	✓
Greer et al.				✓	✓		✓		
Hardy and Grootenboer						✓	✓	✓	
Hinton et al.				✓	✓		✓	✓	✓
Hoover et al.		✓		✓					✓
Huys et al.									
Loftus et al.									
Malberg Dyg and Wistoft							✓		
Nowak et al.			✓	✓	✓		✓	✓	
Passy	✓	✓						✓	
Plaka and Skanavis							✓	✓	
Reis and Ferriera							✓	✓	
Wake and Birdsall						✓	✓	✓	

Figure 2.4b:The physical and academic benefits of school gardens

	Environmental benefits		
Author	Nature connection	Environmental knowledge	Sustainability
Austin		✓	
Baker et al.			
Bice et al.			
Bucher	✓	✓	
Burt et al.			
Cairns	✓	✓	
Carlsson et al.	✓	✓	
Castro et al.			
Chawla et al.	✓		
Datta	✓	✓	
Day et al.	✓	✓	✓
Greer et al.			
Hardy and Grootenboer	✓		
Hinton et al.		✓	
Hoover et al.	✓	✓	
Huys et al.			
Loftus et al.			
Malberg Dyg and Wistoft	✓	✓	✓
Nowak et al.			
Passy			
Plaka and Skanavis		✓	
Reis and Ferriera		✓	✓
Wake and Birdsall	✓	✓	

Figure 2.4c: The environmental benefits of school gardens

The academic benefits of school gardens

Gardens are widely acknowledged as valuable outdoor learning spaces where teachers can draw on various pedagogical approaches to enhance engagement with, and outcomes of, academic learning. School classes frequent gardens for a variety of learning purposes to help link subjects such as Mathematics, Science (Bice et al., 2018; Bucher, 2017; Passy, 2014), Home-economics (Bucher, 2017), English (Wake & Birdsall, 2016), and Health and Physical Education (discussed in the physical health section below) to real-world settings. For example, in Passy's research (2014), one case study school conducted a Mathematics project in the school garden that went for an entire week. The teachers noted to Passy that this project created links between Maths and Science. The students measured leaf size, collected data on plant growth and watched bugs and insects favor certain plants. Moreover, the students are said to have enjoyed their time learning in the real-world. This sentiment is reinforced by many scholars, and it seems that children generally enjoy learning in the school garden (Bucher, 2017; Wake & Birdsall, 2016). While this could be just because of the setting, it could also be because of the pedagogical approaches teachers deploy in the garden classroom.

School garden-based learning presents teachers with the opportunity to experiment with their pedagogical approaches. Witnessing students attempt to apply classroom-based concepts in a real-world setting helps educators discern what information is not translating well; encouraging them to review learning activities for the purpose of implementing a more relevant, engaging, or effective lesson (Hardy and Grootenboer, 2013). Thus, various pedagogical approaches are often trialed in the school garden to enhance the productivity of students' learning experiences. This includes, but is not limited to, culturally responsive pedagogies, experiential pedagogies, and pedagogies of reconnection (Hardy and Grootenboer, 2013).

The use of school gardens for academic learning is generally influenced by broader social contexts. For example, in high migrant and low socio-economic areas in Australia, school gardens are deemed beneficial spaces for teaching food growing and food security (Hardy and Grootenboer, 2013). They provide spaces where education can have a real-world influence on the student's material existence and bolster both their own, and their family's food security and connection to community. In another example, Bucher (2017) compares case studies in Philadelphia and Cuba, suggesting that school gardens are mostly beneficial for personal enjoyment and scientific education in Philadelphia. However, in Cuba, they are valued for their contribution to building agricultural knowledge and skills, contributing to food supply, and for real-world engagement. Cuban schools

extensively use gardens and focus on agricultural endeavors – a direct result of the country's previous state of poor food security. This highlights how the school's wider social and economic context shapes favored academic outcomes for students.

School gardens as healthy spaces

Gardens play a vital role in promoting healthy eating and physical activity among children. Scholars including Day et al. (2022), Nowak et al. (2012), and Ohly et al. (2016), contend that a primary objective of school gardens is to foster healthier eating habits in children. The underlying motivation behind using school gardens for health improvement lies in empowering children to make well-informed decisions regarding their food consumption. By equipping children with a diverse range of skills and experiences in identifying, preparing, and cooking healthy foods, it is believed that they will be more inclined to choose fresh and nutritious options (Hinton et al., 2018; Nowak et al., 2012; Viola, 2006). Another way school gardens help shape healthier children is through promoting physical activity. Gardening is a form of passive movement that encourages dynamic gross and fine motor skill development (Baker et al., 2015; Wainwright et al., 2020). Therefore, participating in gardening is a form of physical movement that helps tackle obesity (Baker et al., 2015; Bice et al., 2018). Even though some scholars contest their ability to establish

healthy eating habits (Huys, De Cocke, et al., 2017), gardens are useful in promoting physical activity and are recognized as healthy spaces.

School gardens enhance social-emotional well-being

The value of school gardens extends beyond academic and physical health benefits, with scholars emphasizing their role in promoting social and emotional well-being and recognising them as valuable spaces for personal development. Ohly et al. (2016) argue that students who may not typically thrive in a traditional classroom setting can experience emotional growth through active participation in school gardens. By providing an environment that allows for greater autonomy, gardens nurture children's confidence and self-reliance, ultimately enhancing their overall emotional well-being (Wake & Birdsall, 2016). This is particularly beneficial for students who struggle with conventional academic work, as the garden offers a framework where they can find success and feel a sense of belonging.

Personal resilience, a vital component of emotional well-being, is also cultivated by engaging with school gardens. Chawla et al. (2014) propose that resilience is fostered in the garden through nature interaction and connection, which helps lower stress levels. Reis and Ferreira (2015) examine gardens as spaces for learning social and emotional resilience, emphasizing how increased access to community gardens enhances a young individuals' ability to critically assess

situations, leading to heightened resilience. These findings align with Viola (2006), who explores the impact of school gardens on remote Indigenous communities. Viola suggests that students with access to gardens in primary school had greater opportunities for cultural, country, and community connections, resulting in increased personal resilience in the face of adversity.

School gardens thus offer educational benefits but also serve as transformative spaces for emotional development and resilience. Through autonomy, confidence, and self-reliance fostered in the garden, students who may struggle in traditional classrooms can thrive. Additionally, the nurturing environment of school gardens promotes resilience through nature interaction, critical thinking, and community connections, allowing young individuals to develop a stronger capacity to navigate challenges and setbacks. These social and emotional benefits contribute significantly to students' overall well-being.

School gardens are social spaces

School gardens are social spaces that can foster strong interpersonal relationships between the school community (staff and students), parents, and the wider surrounding community. Gardens not only enhance personal resilience, as highlighted above, but also contribute to social resilience. Throughout the literature, scholars demonstrate positive outcomes including heightened school engagement

(Bice et al., 2018) and increased food resilience (economic and social access to food, building a complete nutritious diet [Tendall et al., 2015]) within both the student body and the broader school community (Reis & Ferreira, 2015). Moreover children are exposed to the benefits of building multi-generational relationships, including exposure to different points of view (Hinton et al., 2018). Additionally, using school gardens to cultivate social capital is a particularly useful strategy to promote school engagement in communities with large migrant populations (Hardy & Grootenboer, 2013).

A compelling case study illustrating the capacity of a school garden to engage the broader community is found in Hardy and Grootenboer (2013). Their research focuses on a garden in a primary school in a low socio-economic area with a substantial migrant population in Southeast Queensland, Australia. Their school garden was developed through collaborative efforts across both the school and the wider community. Hardy and Grootenboer argue this type of engagement can lead to the establishment of a sustainable, successful, and enduring community garden. Functioning as a communal meeting space, the school garden effectively addresses the food security needs of the community while catering to various community groups. Additionally, it serves as an educational tool, facilitating instructional activities and lessons. By actively involving residents in the garden's maintenance, the burden of time constraints on school staff, often regarded as a significant barrier

to the success of such initiatives, is alleviated (Burt et al., 2018). Moreover, these

school gardens promote the exploration of shared interests among children and the

broader community, fostering a safer and more welcoming neighborhood

environment (Plaka & Skanavis, 2016), while also bolstering neighborhood food

resilience (Reis & Ferreira, 2015). Such initiatives contribute to an overall

improvement in community morale and the cultivation of safer neighborhoods. In

the current context, and especially since COVID-19, schools are reticent to bring

the wider community to campus. More on this barrier is found below.

School gardens enhance environmental knowledge and connection

A child's connection to the natural realm is greatly enhanced by cultivating

curiosity and developing awareness through school garden interactions. This theme

is by far the most highly regarded benefit in the literature (Baker et al., 2015;

Bucher, 2017; Hardy & Grootenboer, 2013; Ohly et al., 2016; Plaka & Skanavis,

2016; Reis & Ferreira, 2015). Bucher (2017), whose research explores the

pedagogical and emotional differences between school gardens in Philadelphia and

Cuba, found that the Cuban students had an increased understanding on the value of

natural capital; that is, how important the environment is to humans. The

Philadelphian students had a more fetishized and sterile understanding, possibly

because their school gardens are predominately used for "science curriculum"

(Bucher, 2017b, p. 15). Enhancing environmental knowledge and understanding increases children's ability to deal with and recognize environmental changes and disasters, such as climate change (Reis & Ferreira, 2015).

Apart from simply connecting students to natural spaces, school gardens spark an innate sense of curiosity that children have towards wild spaces (Wake and Birdsall 2016). A school garden provides a wild space that children can explore within the safety of their everyday lives. Even though they are safe spaces on school grounds, Bice et al. (2018) suggest that time spent in the garden creates an enhanced capacity to engage with the outside, natural world. Christensen and Wistoft (2019) similarly suggest that children who garden develop a critical awareness of environmental problems and a sparked interest towards the natural realm. Developing and fostering that innate sense of curiosity towards the natural is important if we wish for children to gain a deeper appreciation for the environment, and the school garden, as scholars highlight are a perfect space to do so (e.g., Bice et al., 2018; Bucher, 2017; Christensen & Wistoft, 2019; Hardy & Grootenboer, 2013; Reis & Ferreira, 2015; Wake & Birdsall, 2016) .

To summarize, school gardens lead to a myriad of benefits for both the school and broader community. School gardens can help children excel academically when integrated into the curriculum and enhance motor skills,

physical health, and food, personal and social resilience. They can enhance a

child's connection to the natural realm by sparking curiosity and developing

environmental awareness through nature-based practices. Moreover, children who

garden in school have a prolonged sense of well-being, and a deeper connection to

their neighborhood community. School gardens are vibrant social and academic

spaces that can greatly enhance the whole school environment.

The barriers to school gardens

Despite these crucial benefits, a diverse array of barriers prevent schools from

initiating a garden on campus – and not just because they are difficult to maintain.

Although literature on barriers is relatively limited, several studies suggest

consensus regarding key limitations. These include, for example, a lack of funding

and extensive time commitments. Figure 2.5 presents a range of barriers explored in

literature in the form of a clustered bar chart, helping chart the most encountered

barriers. Figure 2.6 (parts a, b, and c) extends Figure 2.5 to list barriers by

author/paper. These visual aids shaped the breakdown of the thematic discussion

below. Curriculum integration, time and staffing are highlighted as the main

barriers to gardens in schools, followed by a lack of support from school

administration.
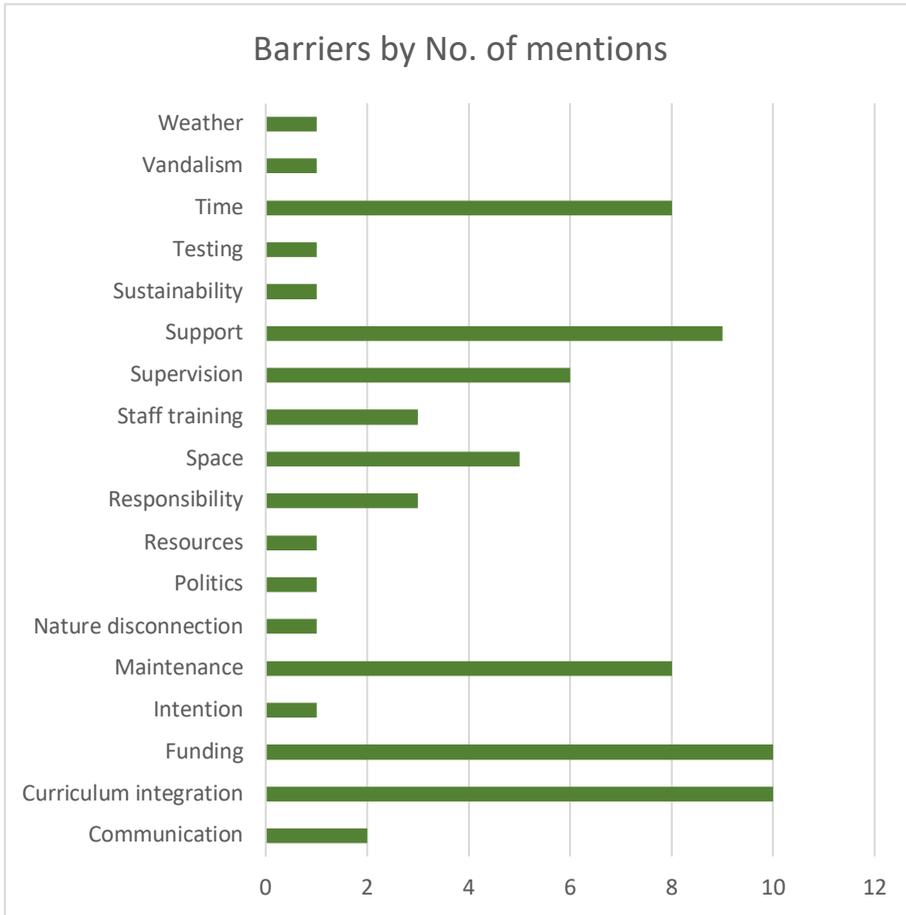
Figure 2.5: The main barriers and their frequency of mention across the literature

| Author | | | | Barriers | | | |
Author	Weather	Time	Supervision	Staff training	Space	Responsibility	Politics
Austin							
Baker et al.	✓		✓				
Bice et al.							
Bucher			✓			✓	
Burt et al.		✓		✓	✓		
Cairns							
Carlsson et al.		✓	✓				
Castro et al.		✓					
Chawla et al.							
Datta							
Day et al.				✓	✓	✓	
Greer et al.							
Hardy and Grootenboer		✓					
Hinton et al.		✓					
Hoover et al.							
Huys et al.		✓	✓		✓		
Loftus et al.		✓	✓	✓	✓		
Malberg Dyg and Wistoft		✓					
Nowak et al.					✓		
Passy			✓			✓	
Plaka and Skanavis							
Reis and Ferriera							
Wake and Birdsall							

Figure 2.6a: The main barriers and their frequency of mention across the literature organized by Author

Author	Maintenance	Support	Curric. integration	Funding	Communication	Vandalism
			Barriers			
Austin	✓	✓	✓			✓
Baker et al.		✓	✓			
Bice et al.			✓			
Bucher			✓	✓	✓	
Burt et al.			✓	✓		
Cairns						
Carlsson et al.	✓	✓		✓		
Castro et al.	✓	✓				
Chawla et al.						
Datta			✓	✓		
Day et al.	✓	✓	✓	✓		
Greer et al.	✓		✓			
Hardy and Grootenboer		✓		✓		
Hinton et al.	✓					
Hoover et al.						
Huys et al.			✓	✓		
Loftus et al.	✓	✓		✓		
Malberg Dyg and Wistoft					✓	
Nowak et al.		✓		✓		
Passy	✓	✓	✓	✓		
Plaka and Skanavis						
Reis and Ferriera						
Wake and Birdsall						

Figure 2.6b: The main barriers and their frequency of mention across the literature organized by Author

Author	Barriers				
	Disconnection	Sustainability	Intention	Resources	Testing
Austin	✓				
Baker et al.					
Bice et al.					
Bucher					
Burt et al.					
Cairns					
Carlsson et al.					
Castro et al.					
Chawla et al.					
Datta					
Day et al.		✓	✓		
Greer et al.				✓	✓
Hardy and Grootenboer					
Hinton et al.					
Hoover et al.					
Huys et al.					
Loftus et al.					
Malberg Dyg and Wistoft					
Nowak et al.					
Passy				✓	
Plaka and Skanavis					
Reis and Ferriera					
Wake and Birdsall					

Figure 2.6c: The main barriers and their frequency of mention across the literature organized by Author

Limited time and funding

Finding adequate time to dedicate to school gardens is a challenge faced by the whole school community, as they juggle various responsibilities which often come before maintaining and integrating gardens. For teachers this can be for many

reasons but, as Blair (2009) suggests, to effectively engage with school gardens teachers need extra support from their administration staff (school board) to dedicate time to gardening initiatives. For Bucher's (2017) participants time was also the main barrier for teachers engaging in school gardens, with many abandoning gardens due to the heavy workload associated with simple but essential tasks such weeding. Increasingly demanding curriculum requirements add to the problem, resulting in staff genuinely not having enough time to maintain the school garden, or plan for ways to integrate it into a lesson (Plaka & Skanavis, 2016). Ultimately, the challenge of finding sufficient time to dedicate to school gardens is a multifaceted problem. From what we can ascertain, there are limited expendable funds available in schools.

Limited time and funding restrict the availability of resources that encourage staff to participate in gardening (Blair, 2009). One study by Hoover et al. (2021) highlighted that many Principals were unlikely to attempt building school gardens due to lack of readily available funding. Greer et al (2019) suggest funding challenges are mostly recognized by Principals rather than educators. Unless schools receive grants or have an active fundraising committee, school gardens are lower on the priority list for school budget allocations. Further complicating matters is that funding is an ongoing requirement involving an initial outset of costs and then expenses related to maintenance such as fertilizers and weed killers. Different

studies have all found that participants struggled with the associated costs of improving and maintaining soil quality (Carlsson et al., 2016a; Plaka & Skanavis, 2016). This is an important consideration when building school gardens.

A lack of support from school administration boards (such as the Principal, Heads of Departments etc.) is identified as a major barrier across the literature. Researchers suggest that administration board staff have an aversion to starting school garden programs; however, for school gardens to be successful, they require this base level of support (Burt et al., 2018). Participants in a Greek study (Plaka & Skavanis, 2016) suggested that push back from the board was a major cause for delays in building gardens and that inadequate support mostly manifests as an aversion to approving school garden programs and providing limited financial aid. Bucher (2017), on the other hand, suggests that school boards have an aversion to expecting too much from their educators and support staff, so approving gardens on campuses is a decision not taken lightly. Perhaps teachers are negotiating more challenges than they like to admit, which was also briefly acknowledged by Blair in 2009. Ensuring that teachers and school administration boards are engaged in transparent conversations about the financial feasibility of school gardens is one avenue towards rectifying this perceived barrier. We thus suggest that clear and effective communication between teaching and administration staff and the entire

school community can contribute to the effective implementation of school gardens and help educators maximize their educational and environmental benefits.

Integrating school gardens into curriculum

Teachers also raise concerns about the difficulty of integrating school gardens into curriculum and how to appropriately engage children in gardening. Christensen and Wistoft (2019) suggest teachers find it difficult to justify integrating school gardens into the curriculum due to the perception that students will not achieve the same academic outcomes. Greer et al. (2019) argue that standardized testing and requirements for students to achieve a base level of knowledge each successive year is a barrier to using school gardens as part of the curriculum. With testing benchmarks set, some teachers feel that straying from the textbook related content will hinder their students' outcomes, even though there are many school gardening programs aimed at helping integrate classroom content and gardening activities (e.g., The *Stephane Alexander Kitchen Garden* [Block et al., 2012], or *Gardens for Bellies* [Malberg Dyg & Wistoft, 2018] programs).

While there are many programs available to support curriculum integration, teachers often feel hopeless in the face of a seemingly overwhelming task of beginning a school garden program and attempting to make it work (Bucher, 2017b; Burt et al., 2018; Huys, De Cocke, et al., 2017; Plaka & Skanavis, 2016).

This can be for many reasons but, as Passy (2014) explores in their article, it is partially driven by a limited understanding of pedagogies that can be used to deliver curriculum content in the school garden. Integrating curriculum and school gardens requires creative thinking, placing extra stress on the teachers (Austin, 2022). Moreover, Malberg Dyg and Wistoft (2018) argue that integrating school gardens into curriculum can be difficult because some children will not want to get dirty from gardening. Thus, classes need to be planned accordingly with options for such children. The barriers outlined here are at odds with the benefits discussed above but needs addressing because it can create problems for teachers wishing to engage in school gardens as alternative learning spaces.

How can barriers to school gardens be alleviated?

There are many considerations for those wishing to engage with school gardens. Expecting barriers, and finding ways to mitigate them, is imperative for success. In reflecting on the literature explored so far, we contend that although there is no simple way to overcome barriers, engaging with the broader community seems to be an effective avenue. Blair (2009) suggested that future scholars ought to investigate the barriers that hinder garden longevity, and based on our data we are able to make a small number of informed suggestions. First, however, we will underscore an important case study that informs our suggestions.

Hardy and Grootenboer (2013) underscore the capacity of school gardens to forge connections with the broader community, which in turn can address perceived barriers. While their study examines a school garden built to enrich student engagement, it also serves as an example of how obstacles can be surmounted. By involving the surrounding neighborhood from the outset, the school created avenues for the maintenance and sustainability. Notably, by enlisting community members or groups in the establishment of the garden, the school in Hardy and Grootenboer's (2013) investigation could pursue various grassroots grants, thus easing the financial burden often associated with school gardens. With increased funding and time at their disposal, teachers could then concentrate on devising suitable curriculum integrations. Approaching the garden challenge as an opportunity to cultivate a shared space--where gardening is a collaborative endeavor between the school and the community—rather than the sole responsibility of teachers proved instrumental to the garden's success. Echoing these findings, Hoover et al. (2021) suggest that augmented funding for additional staff and fostering broader community engagement can contribute significantly to garden upkeep.

This review has highlighted that time, maintenance, funding, and support are all barriers to school gardens. We thus recommend that the whole school community be involved in the process of starting school gardens from the

beginning. When entrenched in community, school gardens are more likely to find success. Bice et al. (2018), Burt et al. (2018), Hardy and Grootenboer (2013), Plaka and Skanavis (2016), and Reis and Ferreira (2015) all highlight that community support and engagement alleviated problems associated with the gardens. Time and maintenance can be overcome by volunteer support from engaging with the broader community (Burt et al., 2018; Hardy & Grootenboer, 2013). Engagement is enhanced if there are active members who regularly engage in the space (Bice et al., 2018; Reis & Ferreira, 2015), which can help to encourage further support from school administration board. While funding is a tougher barrier to overcome, with active support from the local community many school gardens can find success through donation systems or fundraising (Plaka & Skanavis, 2016). Different grassroots community grants also become available if the broader community is involved (as in the case of Hardy and Grootenboer's [2013] study). We thus suggest that the current barriers to school gardens can be overcome by drawing on the surrounding community.

Limitations

The scope of this review, like all reviews, was limited by the key words used in the search string as well as the thematic analysis undertaken. Different key words such as nutrition (Large et al., 2023), curriculum (Walshe et al., 2022), and sustainability

(Prasetiyo et al., 2020) may have yielded different discussions stemming from the inclusion of alternative school garden literature, and different scholars may have picked up or combined different themes (especially implicit ones). Similarly, our method (inspired by Huelskamp [2018]) produced different results to what another literature review methods might have yielded. The implicit coding may have been categorized differently by different disciplines. We did, however, find consensus on the benefits and barriers of school gardens, and trust our synthesis is useful for scholars researching the field (as well as practitioners beyond). We also understand that there may be many successful programs that are not documented in the academic literature. For example, the Gardening Australia television programme showcased a garden where children learnt environmental awareness through outdoor garden interactions (Gardening Australia, 2021). By not including this type of grey literature, our review is limited.

Conclusion and recommendations

While the benefits of school gardens are widely acknowledged, understanding, and addressing the associated barriers is key to their success. We recommend further investigation into why school gardens fail. Approaching schools that have had limited success with gardens provides one opportunity. Alternatively, approaching schools without gardens (Plaka and Skanavis, 2016) would provide deeper insight

into what other barriers might be stopping schools from taking on such spaces. It is possible that a disproportionate focus on benefits in the literature reflects the participants' personal interests in gardening. Future research opportunities investigating challenges, such as interviewing school administrators who some claim push back against school gardens (Bucher, 2017b; Plaka & Skanavis, 2016) would add valuable voices to the conversation and contribute to a more diverse perspective in the literature.

For teachers who are interested in school gardens, there are many opportunities in the establishment stages where they can solidify the success and longevity of the space. While the number of barriers might seem overwhelming, being aware of them from the beginning can help to mitigate the barriers to the success of the space. Exploring relevant case studies of successful school gardening programs is a good start. These can include scholarly documented programs, such as the Australian example mentioned by Hardy and Grootenboer (2013), or programs discussed in reputable news sources such as Gardening Australia's (2021) example featuring Ardross Primary school. Alternative means of sourcing inspiration for a successful program can come from drawing on strategies outlined by gardening focused organizations, such as the Kids Growing City in the United States of America (2024), or government websites such as the Australian based Central Coast Health Promotion Service (2024) who also outline successful school

garden tricks. Government websites are particularly useful given they often

advertise available grants and other local initiatives that schools can join (Central

Coast Health Promotion Service, 2024). Whichever case study or example used to

guide the establishment of a school garden should be regionally relevant, as the

local environment and socio-cultural surroundings are increasingly relevant for

school garden programs (Walshe et al., 2022). This literature review has also

highlighted valuable information to aid in alleviating barriers, such as gathering

interest from students' parents to help manage the garden space. This can help

teachers pre-emptively alleviate the barrier of time (Hardy & Grootenboer, 2013).

Moreover, students are particularly keen to see the school garden succeed if they

are involved in the planning and building of the garden spaces, as they feel a sense

of personal responsibility toward the space (Wake & Birdsall, 2016). Therefore,

using lesson time in appropriate curriculum areas such as Mathematics, Health and

Physical Education, or Science to plan, understand, and build a successful garden

with the students can help to bolster engagement and success.

This review has synthesized the benefits and barriers to school gardens, and

in doing so, provides future scholars with an insight into the most explored themes.

It extends on and provides an updated synthesis and reflection on the common

themes of school gardens, complementing Blair's (2009) review. It seems that

while there is continued interest in school gardens from both educators and

scholars, their challenges are still one in the same. This raises many questions and opens new avenues for continued research. By identifying the barriers that most often hinder success, this review will be particularly useful for scholars investigating school gardens or those wishing to build gardens in schools. The review differs from others in the field by exploring a broad range of benefits and barriers--not just ones relating to niche areas--thus contributing a valuable synthesis. School gardens are hard to maintain, integrate into curriculum, and fund, thus making them unmanageable without the support of the broader community. Most scholars argue school gardens are significant environmental, social, and educational spaces when given the opportunity to thrive. They provide real-world learning, contribute to emotional and physical wellbeing, enhance environmental connection, and increase the resilience of the school and broader community.

2.2: Chapter summary

While school-based community gardens are often lauded by scholars and educators for the rich learning environment they can create for children (Anđić et al., 2020; Beery et al., 2014; Blair, 2009; Block et al., 2012), the above findings highlighted their impracticality for many schools. They are hard to maintain , require significant time (Blair, 2009; Bucher, 2017) and funding (Blair, 2009; Carlsson et al., 2016b Hoover et al., 2021; Plaka & Skanavis, 2016), and are difficult to incorporate into the curriculum (Bucher, 2017; Burt et al., 2018; Huys, De Cocke, et al., 2017; Plaka & Skanavis, 2016). Repeatedly surfacing in the literature, these barriers often linger in the background, obscured by the overwhelming praise school gardens receive by scholars. Nevertheless, when we approach school gardens with a keen awareness of these challenges then they can become havens that enrich the academic environment (Bice et al., 2018; Bucher, 2017; Passy, 2014; Wake & Birdsall, 2016) and student well-being (both physical and emotional) (Chawla et al., 2014; Reis & Ferreira, 2015; Viola, 2006), while simultaneously serving as crucial green spaces that facilitate meaningful engagement with the natural environment (Bice et al., 2018; Bucher, 2017; Christensen & Wistoft, 2019; Hardy & Grootenboer, 2013; Reis & Ferreira, 2015; Wake & Birdsall, 2016). By engaging with the broader community, whether that be parents, guardians, or school neighbours and other

volunteers, and using the garden as a conduit for deeper community engagement, then these barriers can be significantly reduced.

Within the pages of this literature review, practical insights have unfolded, offering a pathway to navigate the challenges that often accompany school-based community gardens. This exploration also provides a contextual understanding of the complex realities that surround school-based community gardens, helping to position the discussion later in this thesis in Chapter 4, where interviews are used at TNSS to understand the teacher's own perceptions of the benefits and barriers of gardening in their school. Additionally, by identifying the barrier of incorporating gardens into curriculum, this chapter provides reason to move forward and begin unpacking how we (as scholars) might be able to better perceive the role school-based community gardens can play in delivering curriculum content. As such, the following chapter (Chapter 3) turns to explore how school-based community gardens align with the Australian Curriculum.

Chapter 3.0: Phase 1

In 2014 the states and territories in Australia switched to a national curriculum which establishes uniform nationwide benchmarks aimed at enhancing educational achievements for all young Australians (Australian Curriculum and Assessment Reporting Authority, 2023). It delineates, by means of content descriptions and achievement criteria, what students should learn and accomplish as they advance through their schooling. I chose to use this national policy document as my starting point to understand what learning outcomes and knowledge youth are expected to have throughout their successive schooling years. After gathering this information, I needed to understand how, and where [5] community gardens could align with the curriculum content. I worked under the assumption that by analysing the curriculum I would be able to effectively understand and locate where community gardens could fit in Australian primary school learning, thus providing a pathway for integrating them into classroom learning.

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[5] The Australian Curriculum analysed in this chapter is now an outdated curriculum document. At the time of writing the paper it was the nationally used curriculum, however in 2023 version 9.0 was released. In January of 2024, after I will have finished this thesis, all schools will be using ACARA's version 9.0 of the Australian Curriculum.

This chapter explores the potential role of community gardens in delivering Australian Curriculum content which, consequently, addresses Research Question 3: H*ow can community gardens help effectively deliver curriculum in primary schools w*hile linking to food system awareness? (highlighted in a visual map in Figure 3.1). However, it primarily serves as a methodology chapter. This chapter offers a practical, mixed-methods approach (Glasgow & Riley, 2013) for examining the Australian Curriculum when there is no conceptual framework available. Researchers who typically conduct curriculum analyses come from pedagogical, curriculum, and teaching backgrounds (Derman & Gurbuz, 2018; Ferguson, 2008; Hemmi et al., n.d.; Lavrenteva & Orland-Barak, 2015) and possess a more extensive foundational knowledge than I did at the outset. Upon reviewing and attempting to employ various curriculum analysis models, it became evident that there were limited options for researchers outside the field of Education to investigate and comprehensively access the curriculum in an informed manner. In response to this challenge, this chapter introduces a methodology and case study example, opening avenues for scholars from diverse fields to utilise, access, and offer insights on the curriculum.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

School-based community gardens battling food disconnection as a manifestation of Environmental Generational Amnesia

Chapter 1

Introduction

Chapter 2

School Gardens: A review on the benefits and barriers

Chapter 3

Mapping the Australian Curriculum

Chapter 4

Doing research with teachers as busy people

Chapter 5

Understanding Environmental Generational Amnesia in school gardens

Chapter 6

Pedagogy, place, and food education

Conclusion

Environmental Amnesia as food origin disconnection can be de-escalated through experiential/place-responsive learning

Figure 3.1: An overview of the thesis structure highlighting what Research Question (in this case RQ3) the chapter is responding to

The following work is an edited version of a published paper under: Walshe, R., Evans, N. S. (Snowy) & Law, L. (2022). Mapping community gardens in the Australian National Curriculum: A curriculum analysis model. *Issues in Educational Research*, 32(2), 784-804. http://www.iier.org.au/iier32/walshe.pdf

3.1: Mapping community gardens in the Australian National Curriculum: A curriculum analysis model

Abstract

The Australian Curriculum is a policy document that directly influences the lived realities of millions of students and teachers. However, navigating and understanding the Australian Curriculum can be confusing due to discipline-specific meta-language. This poses problems when attempting to access the Curriculum in research that extends beyond the Education discipline. In response, this paper proposes a novel model that facilitates the analysis of curriculum documents for those outside the Education discipline. To illustrate the method, the paper provides an example of how and where community gardens align with the content descriptions of the Australian Curriculum. A word frequency analysis suggests that community gardens are most closely aligned with the Humanities and Social Science's (HASS) and Health and Physical Education (HPE) learning areas. A word tree analysis thematically groups content descriptions and discusses how community gardens can support classroom

implementation of both HASS and HPE. The method presented will benefit scholars outside the Education discipline who seek to engage with the curriculum. It also extends discussions surrounding how to best integrate gardens in schools.

Introduction

Curriculums directly influence the lived realities of current and future learners. Curriculum documents are important for their capacity to have long-standing, real-world effects (van den Akker, 2004). They guide teaching practices and underpin the basic foundational knowledge and skills of future generations. Yet, for all their worth, curriculum documents are hard to understand. Language is often discipline-specific and requires extensive meta- language to break down, understand, and interpret in a meaningful or tangible way. In this sense, curriculum documents tend to be written for educators and exclude, rather than include trans and cross disciplinary voices. This is certainly what we found when the first author, a geographer, attempted to undertake an analysis of the Australian Curriculum for a project investigating how community gardens can enhance learning outcomes for students in Years P-6.

The research was inspired by our understanding that community gardens have long been recognised as sites of constructive academic learning (Wake & Birdsall, 2016). Community gardens provide inviting or inclusive spaces for teaching STEM (Science, Technology, Engineering and Maths) education (Krasny & Tidball, 2009), Mathematics and English (Ohly et al., 2016) exploring dietary behaviours (Huys, De Cocker, et al., 2017), and improving physical health and

wellbeing (Malberg Dyg & Wistoft, 2018; Ohly et al., 2016), and can encourage engagement with place (Wake & Birdsall, 2016). Yet, when seeking a way to use gardens as tools to enact curriculum, difficulty can arise. For us as researchers, it became apparent that curriculum documents are relatively inaccessible to non-education specialists. We contend that a curriculum is supposed to be a merging of discourses, encouraging interdisciplinary dialogue (Hemmi et al., 2013). In response, the first author developed a curriculum analysis model.

Curriculum analysis is important. In Lavrenteva and Orland-Barak's (2015, p. 654) words, by performing a curriculum analysis, "we can learn a lot about the explicit and implicit approaches and messages carried and conveyed regarding teaching and learning a particular subject matter area." A curriculum analysis model provides a powerful tool for understanding curriculum documents and has the potential to reveal many things, from the social and political values of a particular time period to the cultural dynamics of schools.

Curriculum accessibility is critical for understanding what is to be taught. Making the curriculum easily accessible to those outside education will add multiple specialised and valuable insights capable of bringing a richness of intellectual and disciplinary diversity to deepen student learning experiences. The aim is to open a pathway for specialised knowledge fields outside of education to

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access the Australian Curriculum and make valuable contributions to student learning. We first provide a review of existing curriculum analyses models. Curriculum analyses are performed in a variety of ways, from comparative or framework analyses, to development, policy, and enactment analyses, each providing new insights. Our review reflects these categories and provides commentary on the positives, challenges/ barriers of the models, and replicability for those outside education. This is followed by the application of the first author's model within a school community garden context that sits across Year P-6 curriculum. The section simultaneously contributes to discussions surrounding how community gardens complement and create opportunity for enhanced delivery of the curriculum. The model will be of use to anyone who has an interest in curriculum analysis.

Curriculum analysis models

Curriculum analysis is an art form, and there are few methods, models, or frameworks for analysis that exist outside the education discipline. A search of the online databases *ERIC, Scopus,* and *Informit A+ Education* was conducted in 2021 using a combination of the following search terms: primary school, curriculum analysis, curriculum evaluation, curriculum development and evaluation model. While there was no shortage of review models existing, each had aspects that

makes adaptation difficult. Papers that did not provide a descriptive methodology for their evaluation or analysis model were excluded. Out of the models found, four undertook transnational studies across Asia, Europe, Australasia, and North and South America (Derman & Gurbuz, 2018; Hanisch et al., 2014; Hemmi et al., 2013; Lavrenteva & Orland-Barak, 2015). The remainder are from Australia (McCuaig, 2018; Mosely et al., 2021), Jamaica (Ferguson, 2008), Israel (Hadar & Tirosh, 2019), Mexico (Paredes-Chi & Viga-de Alva, 2018), New Zealand (Soutter et al., 2012), United States of America (Land et al., 2019), United Arab Emirates (Tezcan-Unal et al., 2019), and Turkey (Yilmaz et al., 2021). Not all papers focused specifically on curriculum documents themselves. Some focused on the delivery of curriculum, or stakeholder perspectives, and some even focused on supportive materials. We emphasise that all analyses are valuable in understanding the intricacies of curriculum analysis. Whilst the models presented in this paper are not the only ways to analyse curriculum, they are the only ones found where the analysis methods are explained clearly enough for replication. We now discuss the papers thematically through comparative curriculum analyses and framework analyses.

Comparative curriculum analyses

Each of the transnational studies provides a comparative curriculum analysis, meaning they all compare aspects of, or entire curriculums, across countries. Hanisch et al. (2014) used a categorical framework analysis to understand the 'environmental' potential of syllabi in five schools across England, Germany, Italy, Romania, and Spain. They discern that theirs was one of the first transnational, comparative curriculum analyses to focus on the potential of 'greenness' across curriculum syllabi. Using mixed methods research techniques to gain both stakeholder (teacher) perspectives and coded content analysis, they followed recommendations from Mayring (1983, in Hanisch et al., 2014), to paraphrase the original content to create an ease of reading and categorisation. By performing the coded content analyses individually, they can triangulate with great accuracy how the environment is represented across each curriculum. Although acknowledged in the paper, comparing international curriculums means their model relies heavily on participant contributions (surveys and curriculum translation) and could not occur without them.

Also looking at environmental education across different countries, Derman and Gurbuz (2018) focused solely on science curriculums. Again, using coded content analyses as their main data derivative, Derman and Gurbuz summarised the

similarities and differences of environmental education presence across curriculums in Turkey, Australia, Singapore, Ireland, and Canada. They deployed both inductive and deductive research approaches but highlighted that there is no systematic method to their coding. Translating this method would be difficult, as they used an adaptation of a previously developed scale to evaluate the presence of environmental education yet did not provide the reader with their adaptation. In a similar study, Hemmi et al., (2013) focused on an individual syllabus (mathematics) to compare assistive materials for teachers across Sweden and Finland. They deployed the analytical tool developed by Davis and Krajcik (2005, in Hemmi et al., 2013), which categorised and evaluated the content of teacher material. The model deployed by Hemmi et al. would not be appropriate for analysing a stand-alone curriculum document such as the Australian Curriculum, as it compares across multiple countries and Australia has one curriculum, but it does highlight the varying ways comparative analyses can be performed.

The final comparative study, and the largest, to be discussed under this heading was by Lavrenteva and Orland-Barak (2015). They explored English as a foreign language (EFL) in curriculums across Brazil, Croatia, Ecuador, Egypt, Finland, Hong Kong, Hungary, Israel, Mexico, Norway, Poland, Singapore, Sweden, and Czech Republic. They used the Ben-Peretz curriculum analysis matrix, developed in 1977. Their coding is simple to understand and follow,

however, the Ben-Peretz model requires a proficient understanding of student and teacher dimensions (realities and theories), alongside subject content and teacher 'milieu' - things which are less familiar to those outside the education field. Their model, however, is explained in a clearer capacity because the authors break down and visually represent the dimensions (phases) of the research, in comparison to models such as Hemmi et al.'s or Derman and Gurbuz's, making it more user friendly for those outside of education.

Framework analyses

Framework analyses make up the bulk of the curriculum reviews available. This section presents a summary of those curriculum reviews using frameworks and highlights their strengths, weaknesses, and replicability for education novices. Frameworks explored include those that use software tools, draw on predefined matrices or frameworks, and others that heavily rely on stakeholder engagement. The analyses that inspired the novel model presented in this paper are also explained.

The simplest of all curriculum reviews makes use of concept mapping, and word frequency analysis, using software analysis tools to do so. Moseley et al. (2021) sought to understand the representation of 'Design' in the Australian Curriculum. Their word frequency analysis was performed using the software

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NVivo and categorically linked to concepts of design through a critical analysis. However, they focused on a single learning area rather than content descriptions across the entire curriculum. Translating this method was simple, but when looking at the content descriptions, rather than learning areas, the need for a systematic way of critically engaging with the context of both word use and individual descriptions became apparent. If their model had focused on the broader content descriptions, it would be applicable to almost any content analysis setting. Nevertheless, the absence of education meta-language in Mosely et al.'s (2021) paper provides an easier pathway into navigating curriculum than most others, for someone outside of education.

Using predetermined frameworks is a common way to analyse curriculum. Ferguson (2008), in reviewing Jamaica's curriculum, used a form of coded content analysis framework that focused on latent (thematic) and manifest (explicit) content. The review is straightforward, but in using a pre-developed framework for coding (sustainability based) it is difficult to translate to other research themes. Without knowing how the framework was developed, it is problematic to imagine how alternative research themes fit. In another study, Soutter et al. (2012) explored the New Zealand curriculum using a similar method to Ferguson (2008). They adopt a predefined wellbeing framework or 'matrix' and apply it across two phases. The first phase focuses on explicit mentions of wellbeing and the second applies a

conceptual lens of wellbeing to guide coding. If the method for developing the

wellbeing framework were provided, it might be easier to adapt for an alternative

theme. What the papers in this review highlight is that there is a tendency to use

frameworks without explaining how the authors adapted their research theme to the

framework. This makes it difficult for others to use, especially those who are not

familiar with the intricacies of curriculum.

Curriculum analyses need to be explained in easy-to-read formats, otherwise

replicating them becomes a complicated task. Yilmaz et al. (2021) used Bloom's

taxonomy (Adams, 2015) as a framework for a coded content analysis to evaluate

Turkey's preschool curriculum. This method is very valuable to understand how the

objectives and goals of a curriculum contribute to child development. However,

their explanation for their methods is confusing, complicated and lacks description,

making replication of the methodological process much harder. Paredes-Chi and

Viga-de Alva (2017) used a framework to analyse the presence of environmental

education in the Mexican primary school curriculum. Their framework drew on

previous Mexican curriculum theorists to account for cultural sensitivity, and for

this reason is not replicable. If scholars were to use this study as a basis for their

own, they would need to reinterpret the framework within their own cultural

context. This would require extensive work as the model accounts for indigenous

knowledge, psychological implications of human-nature relationships specific to

their country of origin, and knowledge of local ecosystems (Paredes-Chi & Viga-de Alva, 2017). However, like our own study, Paredes-Chi and Viga-de Alva defined chosen search words based on their theoretical perspective of environmental education, then sought to understand how the search words were represented within learning materials.

Some framework analyses draw on participation from stakeholders, meaning they engage with, and capture, the social responsibility that curriculums have. Tezcan-Unal et al. (2019) used a 'learning organisation lens' as a framework to highlight how tertiary education curriculums can be assessed and changed. A learning organisation lens categorises learning curriculums into three main areas: practices, leadership, and environment. Their model is based on document content analysis, surveys, and a mix of interviews and focus groups. The reliance on stakeholders and multiple phases makes using this framework a lengthy and complicated task. It also draws focus away from the content of the curriculum and shifts it to stakeholder opinion, making it redundant if the content is the core focus. Engaging with stakeholders tends to be a trend in curriculum analysis, as Hemmi et al. (2013), Hanish et al. (2014), and Hadar and Tirosh (2019), all also require some level of engagement with stakeholders to complete their analysis. While engaging with stakeholders helps provide interesting perspectives, it makes the method more

complex and time intensive, which hinders replicability. Engaging stakeholders also removes the opportunity to do a content analysis alone.

Much like environmental education, mathematics appears to be a popular discussion topic in curriculum. In a US study focusing on materials to support mathematics curriculum engagement in elementary children, Land et al. (2019) suggested that open curriculums are the most beneficial for problem solving. Their use of word frequency analysis gives the data a quantitative richness and is an easily translatable method. Their model creates a complete view of how lessons can best reflect curriculum, but it is not relevant for those who are not considering curriculum enactment, and less tangible for those outside education who do not often engage with enacting curriculum concepts. Mosley et al.'s (2021) and Land et al.'s (2019) models are the only two found that consider the value of using both qualitative and quantitative data which makes for more insightful research (Tashakkori & Teddlie, 2023).

In sum, from our review of the literature, we are able to highlight two things. First, that qualitative analyses are favoured in the curriculum analysis field. Nine out of twelve models reviewed used purely qualitative analysis methods (Derman & Gurbuz, 2018; Ferguson, 2008; Hanisch et al., 2014; Hemmi et al., 2013; Lavrenteva & Orland-Barak, 2015; Paredes-Chi & Viga-de Alva, 2017;

Soutter et al., 2012; Tezcan-Unal et al., 2019; Yilmaz et al., 2021). Second, there is a trend of relying on participants to make or give deeper meaning to curriculums (Hadar & Tirosh, 2019; Hanisch et al., 2014; Tezcan-Unal et al., 2019). It is also worth noting that without understanding the milieu of teachers, analysing documents aimed at supporting their role would be difficult for anyone outside of education. While each study contributes new perspectives to curriculum review literature, only Mosley et al. (2021) explicitly outlined their methodology in a way that is easily replicable. Having considered the need for an analysis model that can move across curriculum areas and requires no discipline-specific meta-language (Land et al., 2019; Lavrenteva & Orland-Barak, 2015; Soutter et al., 2012), we now explain our curriculum analysis model.

Curriculum analysis model in this study

This section describes the curriculum analysis model presented in this paper, and then presents the steps to perform it. The model is a combination of key word frequency and word tree (context) analysis. Our model design follows recommendations from Tashakkori and Teddlie (2010), who outlined that using a quantitative first cut of data, followed by a more qualitative, subjective phase, creates a valid mixed-methods study. The model is a pragmatic way of highlighting that there are alternative ways of analysing and interpreting curriculums. The following section, where the case study example is presented, explains how the model works in the context of a school community garden.

The novel model presented in this paper is inspired the word frequency and content analyses used by Mosley et al. (2021), and Land et al. (2019). Our model, presented in Figure 3.2, is visually represented in a style inspired by Lavrenteva and Orland-Barak (2015). The model shows the benefits of deploying both qualitative and quantitative research to create a comprehensive approach for analysing curriculum.
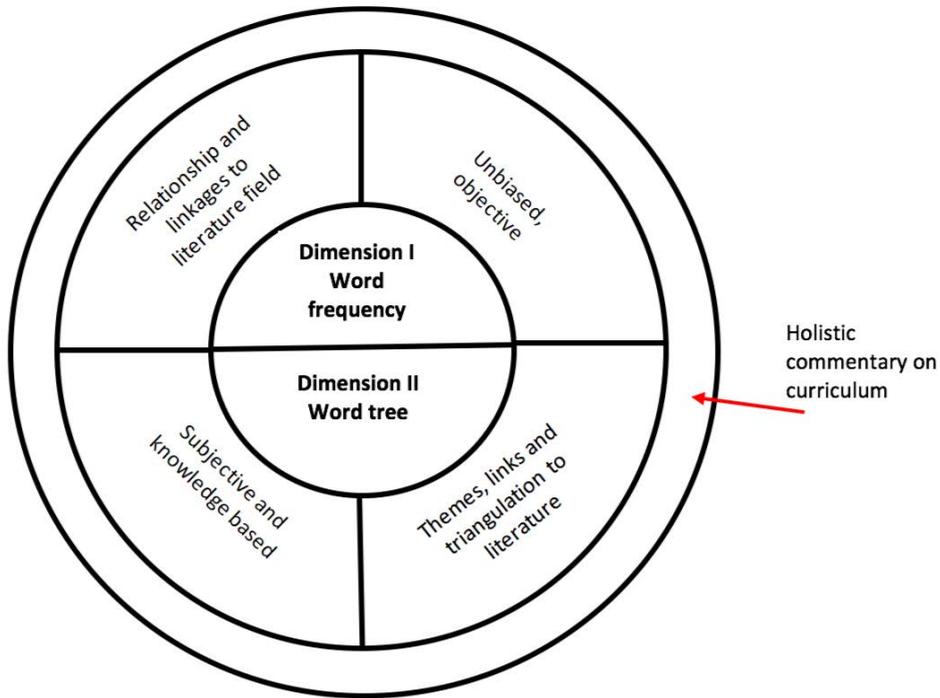
Figure 3.2: Curriculum analysis model dimensions and benefits (adapted from Lavrenteva and Orland-Barak, 2015)

Dimension 1 of the model, word frequency, uses quantitative, objective data that creates links to the literature field of choice. Dimension 2, the word tree analysis, allows the researcher to determine themes, links and patterns across the data and create a discussion around it. The model requires only access to the software *NVivo12* and a field of literature.

Word frequency analysis

A word frequency analysis is a computer assisted data analysis technique that measures the frequency of a word's occurrence in a specific document (Cohen et al., 2011). Word frequency analyses are preliminary research techniques, and help researchers decide if there are casual patterns worthy of further investigation (Silverman, 2011). This type of analysis can also assist in creating visual, easily digestible information (Cohen et al., 2011).

To perform the word frequency method for this analysis model there are three phases. The first is to build the master document which contains the keywords (keywords defined by authors in the articles) from a body of literature. Once all the keywords are collated into an *Excel* spreadsheet, they can be run through the program *NVivo 12*, and the top occurring words can be extracted. These become the search terms, or key words (emphasis on the space between these words). This list of search terms, or key words, should be exported into an *Excel* spreadsheet and will become the master document where all further analyses are performed.

The second phase is to run another general word frequency count across the curriculum documents for each year level, again using *NVivo 12*. Once the program has completed this function, export the files into *Excel* documents. These *Excel* files contain a list of every single word used, and its frequency, from each

curriculum document. These documents will contain a word, word length, count (frequency), and weighted percentage column. The count column is the important column for this research. At this point begin searching for the presence of the top 50 key words, or search terms, using the list 'CTRL F' (search) function to search. List the count of each of the key words' occurrence, (i.e., 12, or 0), next to the key word in the master document. If it is not present, then place a zero next to the key word in the master document. Once all the key words and their occurrence (if at all) have been compiled in the master document, the final phase of analysis can occur.

Last, using *Excel*, the average, percentage, and sum of key words present in each year level's curriculum document can be calculated. The SUM function adds the count, or frequency, of every key word used for each year level and provides a total number. The AVERAGE function reveals the average number of times all the key words are used in the document (i.e. 5, or 0), and the PERCENT function suggests how much of the total curriculum document is comprised of the 50 key words (i.e., 6%). By performing these basic calculations, it is possible to understand whether their use is significant in comparison to non-search terms and worth further investigation (without using more complicated statistical analyses). The process reveals trends and patterns which can be visually represented in charts and diagrams, and encourages either further investigation, or confirms further

investigation is not warranted. The next step in the model is to perform a context analysis using a word tree function in *NVivo 12*.

Word tree analysis

A word tree analysis is a visual information-retrieval technique that allows for rapid, qualitative data extraction from textual documents (Wattenberg & Viegas, 2008). Word tree analysis allows us to engage with literature and create insightful discussions. A key benefit of this method is its ability to provide a snapshot of a singular word's context (Wattenberg & Viegas, 2008). A downside is that if used as a stand-alone technique, the broader document tends to be excluded from analysis. The method is performed by using the 'word tree' function from the text search query in NVivo 12. The parameters for this query should be set to ten words occurring on either side of the search word.

To critically engage with curriculum from a discipline-specific lens such as geography, it is key to consider the context of frequently occurring words. The word tree function reveals the context behind a frequently used word and, when looking at the particular context of interest across the entire document, we begin to find patterns and themes emerging. As language is often discipline specific, the context of words will be interpreted differently depending on the lens applied. This

opens the content of the curriculum up for an interesting array of discussions, where new insight into the power and use of a word could arise.

The word frequency and word tree analysis methods outlined above provide both a quantitative and qualitative way of analysing curriculum documents. They help researchers decide whether there is a link between curriculum and literature that is worth exploring. The word tree analysis allows researchers to analyse the context and thematically group words. Coupled, these methods provide a way to analyse curriculum from any specific knowledge field. The following section demonstrates how to apply these analyses. The example research theme is 'community gardens' and is discussed through a Geography lens, from the Australian Curriculum for P-6 (ACARA, 2017), which is the larger scale focus of the research.

Case study example

Background

The Australian Curriculum is a set of policy documents, separated into eight learning areas, that outline the required learning outcomes for each year level in every state and territory in Australia (ACARA, 2017). The eight learning areas are: Mathematics, English, Humanities and Social Sciences, Technology, Science, Arts,

Language, and Health and Physical Education (ACARA, 2017). In each learning area there are a subset of content areas containing a set of content descriptions. For example, English has three strands: literacy, language, and literature. Each strand contains a set of content descriptors that provide the specific knowledge, understanding and skills to be achieved within each learning area and year level. It is the content descriptions that are embedded in all eight learning areas that are of interest to us in this paper.

The vantage points are important to consider, and define, for this model to work. This case study looks at learning as a process of inquiry, rather than a listening process (Usher, 2020), as gardens are recognised as outdoor learning sites where children can experience their learning, not just learn from a book (Becker et al., 2017). As the lead author's discipline is geography, implications are that the discussion is interwoven with theories from geography and aligns with inquiry-based pedagogies.

The following section deploys the novel analytical model described above to analyse how and where community gardens align with P-6 content descriptions of the eight curriculum areas pertaining to the Australian Curriculum (ACARA, 2017). We then deploy the model presented above as an example to how it works

and synthesise the results of the key word frequency and word tree analysis with a discussion weaved throughout.

Context specific word frequency analysis

The key words for this curriculum analysis are derived from relevant community garden and environmental education journal articles which formed the basis of a literature review focusing on gardens in schools. The literature review search phrases included: 'community garden' OR 'urban agriculture,' 'place-based,' 'environmental education' OR 'place responsive education' and 'primary schools.' When looking for relevant articles, the following journals appeared to be prominent in producing community garden and/or environmental education literature: *The Journal of Environmental Education, Environmental Education Research, Local Environment, Geographical Review,* and *Leisure Studies*

All keywords were collated into an *Excel* spreadsheet and run through a word frequency count using *NVivo 12*. The top 50 keywords were chosen as the key words for searching curriculum documents with. The top 50 are named in Table 3.1, as best representing the community garden literature.

Table 3.1: Keywords used to perform the keyword frequency analysis

Rank	Keywords				
1-5	Garden	Community	Urban	Food	Social
6-10	Place	Place-based	Culture	Public	Agriculture
10-15	Nutrition	Learning	Geography	Environment	Environmental
16-20	Cultural	Curriculum	Children	Health	Relationship
21-25	Development	Nature	Engagement	Literacy	Resilience
26-30	Food security	Practice	Pedagogy	Social movement	Science
31-35	Behavior	Wellbeing	Backyard	Landscapes	Economy

36-40	Effectiveness	Subject	Key member	Vegetable	Experiential. learning
41-45	Achievement	Sense of place	Colonial	Difference	Cairns
46-50	Management	Empowerment	Political	Rights	Sustainability
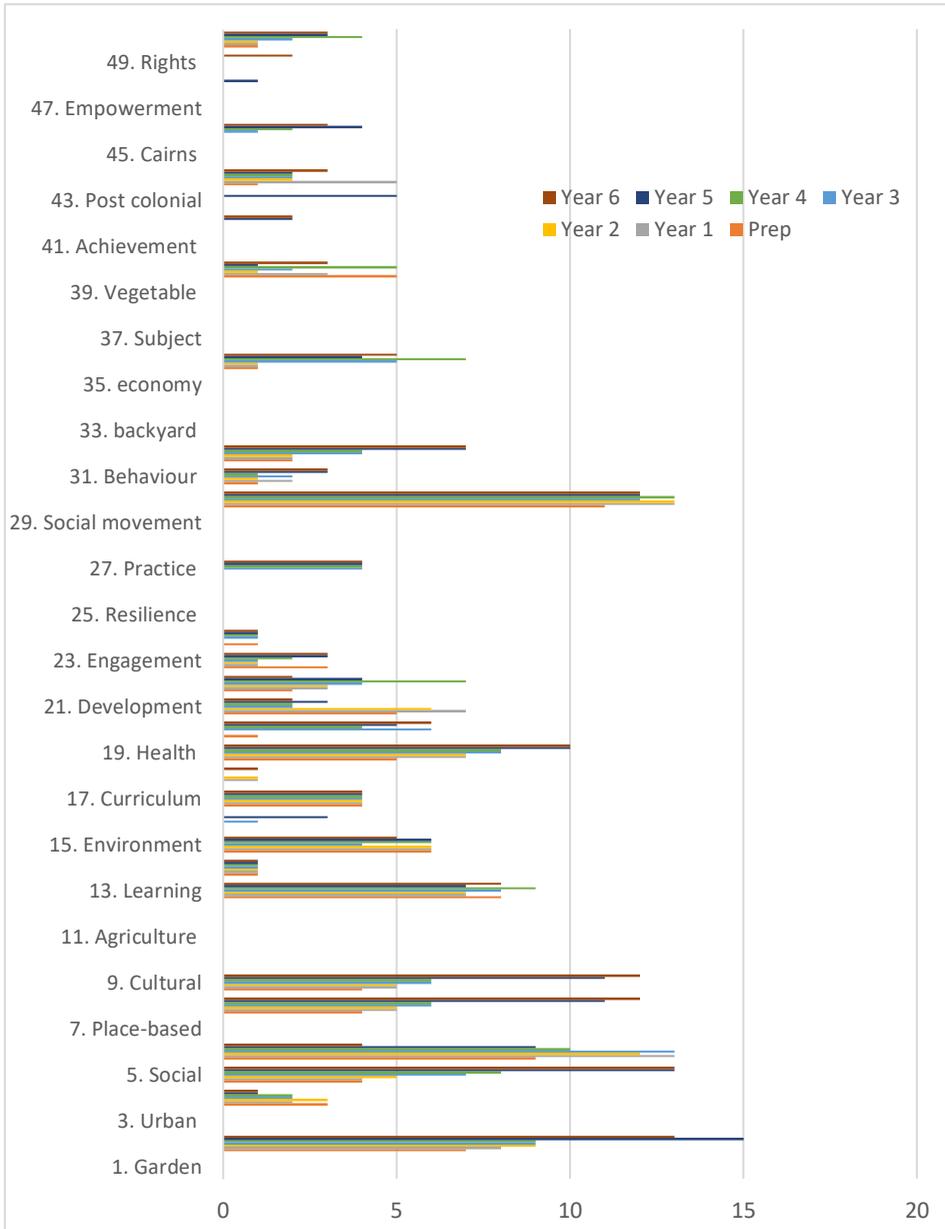
Figure 3.3: Keyword frequency in Prep to Year 6 curriculum documents

Figure 3.3 shows that the highest sum of master keywords present in the content description documents is 142 in Year 5. These 142 words represent more than 5% of the total 2226 words present in the content description document for Year 5. These numbers suggest there is something here worth investigating further, as the words used in the content descriptions from the Australian Curriculum overlap with the keywords selected from the scholarly literature. While all curriculum documents could be analysed further, the Year 5 frequency suggests this is the most promising from which to draw parallels. Analysing the context of every individual keyword present in the document does not encourage insightful discussion, so the top occurring keywords will be used in the word tree content analysis.

Figure 3.4 shows the words with the highest frequency across all the analysed documents. 'Community' occurs in the top 20 words, or the top 1% in both Years 5 and 6 content description documents; and in the top 50, or 2.5% in Years 3 and 4. Considering there are over 2000 unique words used in each document, this can be considered a promising factor. A word used often enough to be in the top percentile highlights that it is frequently used. The following seven words will be explored in a word tree analysis: 1 Community; 2 Cultural; 3 Health; 4 Science; 5 Social; 6 Sustainability; and 7 Wellbeing.table

Figure 3.4: A sunburst chart visually representing the rate of keyword frequency in Years P-6 curriculum content descriptions (ACARA, 2014a; 2014b; 2014c; 2014d; 2014e; 2014f; 2014g)

Context specific word tree analysis

This word tree content analysis allows us to focus on the top occurring key words to extract deeper information, such as where each word falls in the content descriptions and how they are used. This is particularly important when thinking about the seven key words from the vantage point of geography or another discipline. By understanding the context of key words in education it is then possible to see shared or deviating meanings. Figure 3.5 is an example of what a word tree with a search parameter of ten words looks like. The words on either side of the key word give it context and allow us to look for themes and patterns across their use.
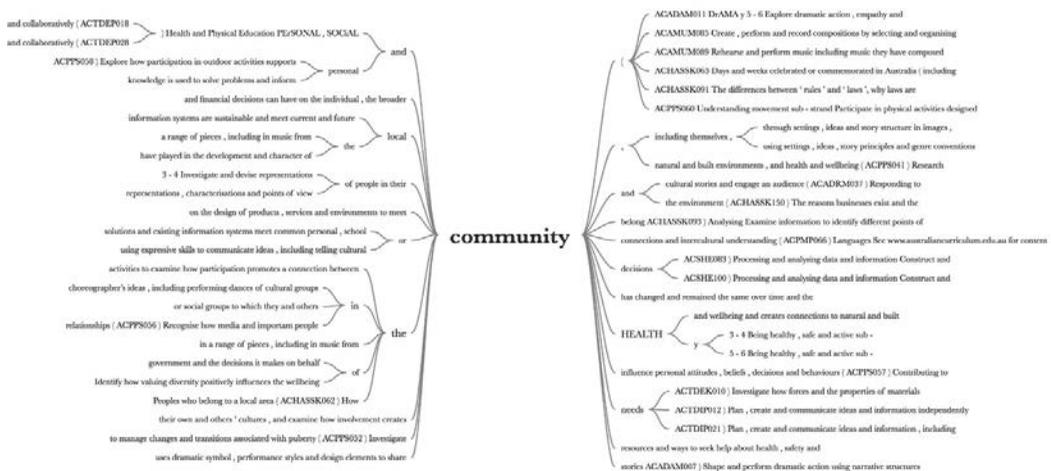
Figure 3.5: An example of what a word tree looks like using the top occurring key word: community (use 'zoom in' function in web or PDF reader)

The emergent themes from the word tree analysis for the seven key words can be summarised under three headings: 1. Place/belonging; 2. Connection to the natural and built environments; and 3. Identity and heritage. We discuss the key words in the context of these themes with the aim of finding spaces of shared meaning and overlap. How can our specific focus of community gardens provide windows of opportunity to support the implementation of curriculum in the classroom? We now use these headings to explore potential cross-disciplinary engagement opportunities with Australian Curriculum content descriptions.

Place/belonging

In geography, place has many meanings, inclusive of both the tangible (physical) and intangible (felt). The discipline tends to place equal weight on both meanings, to understand the importance of a sense of place. A sense of place encompasses concepts such as place belonging and place attachment (Scannell & Gifford, 2014), which are important for building long-term resilience and wellbeing. Education in Queensland places considerable weight on wellbeing amongst students (Queensland Education, 2018). From a geography point of view, building sense of place is considered a gateway to wellbeing and we think community gardens provide one tool to work towards greater wellbeing.

Across Year 4 and 5 Australian Curriculum key words that are frequently used together are health, wellbeing, cultural, social and community. These words often appear coupled or grouped together in the Humanities and Social Sciences (HASS) and Health and Physical Education (HPE) curriculum learning areas. Figure 3.6 contains excerpts of the content descriptions which were present in the word tree analysis and reflect the theme of place and belonging.

Communicating and interacting for **health** and **wellbeing** sub-strand (contains learning goals)" – *Year 4 Health and Physical Education*

"The different **cultural,** religious and/or **social** groups to which they and others in the **community** belong (ACHASSK093)" – *Year 4 Humanities and Social Sciences*

"Investigate the role of preventive **health** in promoting and maintaining **health,** safety and **wellbeing** for individuals and their communities (ACPPS058)*" – Year 5 Health and Physical Education*

"Identify how valuing diversity positively influences the **wellbeing** of the **community** (ACPPS060)" – *Year 5 Health and Physical Education*

Figure 3.6: Excerpts from the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2014e; 2014f), Years 4 and 5 content description documents

The content descriptions in Figure 3.6 are an example of how Community, Health, Culture, Social and Wellbeing tend to be clumped together. Grouping these key words in content descriptions together highlights their synergies. Literature suggests that safe and connected communities are healthy, diverse and have a collective shared sense of wellbeing (Hooper et al., 2015). Community gardens are often central hubs of connection, acting as spaces that increase sense of place and belonging. Environmental knowing can increase place belonging (Law, 2019) and as gardens are an immersive, natural environment, they enhance environmental knowing (Wake & Birdsall, 2016). But where might opportunities lie in the use of gardens?

Community gardens in schools can support the implementation of the content descriptions presented in Figure 3.6 as they are spaces where diversity is recognised through food growing practices. Growing food integral to other cultures increases engagement with those outside of someone's social group (Baker, 2004; Kingsley et al., 2009). Engaging with those outside of your social group at a particular site increases a sense of place, by fostering a shared sense of place attachment. For this reason, gardens are often used in displaced and fractured migrant communities (Kingsley et al., 2020). Using gardens to assist in implementing content descriptions can contribute to both a felt (intangible) and understood (tangible) sense of place. We acknowledge sense of place as part of

both the natural and built environments but building the connection to these environments is worth exploring further.

Connection to the natural and built environments

Weaved throughout the HPE learning area is the theme of building and maintaining connection to both the natural and built environments. Geographers often consider the connections humans have to the built and natural environments and see green infrastructure as a mid-way between them. Community gardens are green spaces that allow us to explore the natural realm, and our role within it, from a central location within the built environment (Baker, 2004; Walstra, 2021). They provide the opportunity to witness ecosystem services in real-time, such as pollination, the life cycle of plants, habitat provisioning, and climate regulation (cooling). The content descriptions that community gardens support as a type of mid-way point are illustrated in Figure 3.7.

> "Participate in outdoor games and activities to examine how participation promotes a connection between the **community,** natural and built environments, and **health** and **wellbeing** (ACPPS041)" – *Year 4 Health and Physical Education*
>
> "Explore how participation in outdoor activities supports personal and **community health** and **wellbeing** and creates connections to natural and built environments (ACPPS059)" – *Year 4 Health and Physical Education*

Figure 3.7: Excerpts from the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2014e), Years 4 and 5 content description documents

The wording of the content descriptions in Figure 3.7 is extremely specific and has the capacity to create a reality that immerses children in the two worlds in which they belong (the natural and the built). These descriptions suggest that personal and community health/wellbeing are directly affected by the connection to the natural and built environments. Malone (2007) argued that a child will grow up with increased resilience and wellbeing if given the opportunity to experience and play while immersed in the natural realm. Community gardens also increase passive physical activity which improves overall quality of life (Wake & Birdsall, 2016).

By incorporating community gardens into the curriculum, HPE classes could have an increased capacity for instilling the tools for both physical and mental wellbeing.

Identity and heritage

Community gardens are an ideal way to passively engage in the rich, deep heritage of cultures through a single commonality we all share: food. Finally, culture is embedded in everything around us and in everything we do. Geographers understand the cultural landscape as integral to everyday life to the foods we eat, social interactions and world views. It is also an evident theme across the P-6 curriculum (ACARA, 2017). Throughout both HPE and HASS content descriptions the need to understand heritage and identity of both oneself and others is highlighted, this is evident in the examples in Figure 3.8. Community gardens increase awareness of other cultures and one's own heritage through food growing practices and citizenship (Baker, 2004). While food is not mentioned in the descriptions, it is a direct connection to culture, and the practices involved in cultivation are a sensorial way of (re)gaining insight and connection to said culture (Bhattacharya, 2021). Content descriptions that place value in understanding culture are illustrated in Figure 3.8.

> "Research own heritage and **cultural** identities, and explore strategies to respect and value diversity (ACPPS042)" – *Year 4 Health and Physical Education*
>
> "Participate in physical activities from their own and others' **cultures**, and examine how involvement creates **community** connections and intercultural understanding (ACPMP066)" – *Year 5 Health and Physical Education*
>
> "The world's **cultural** diversity, including that of its indigenous peoples (ACHASSK140)" – *Year 6 Humanities and Social Sciences*
>
> "Participate in physical activities from their own and others' **cultures**, and examine how involvement creates **community** connections and intercultural understanding (ACPMP066)"- *Year 6 Health and Physical Education*

Figure 3.8: Excerpts from the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2014e; 2014f; 2014g), Years 4, 5 and 6 content descriptors in the HPE and HASS curriculums

This creates a sense of belonging to a community as food fosters emotional bonds with others (Nettle, 2014; Pascoe & Wyatt-Smith, 2013). Learning in a garden does not just encourage awareness of other cultures and world geographies, it increases a sense of place and self-representation within the local cultural landscape. Geographers consider we are as much a part of the landscape as it is of

us; it is integral to building belonging (Kahn, 2002; Malone, 2007, 2016). Belonging is developed in gardens as where diversity is encouraged, and education occurs naturally via engagement, observation, and participation (Kingsley et al., 2020).

When analysing the context of the key words, it becomes clear that some learning areas are more heavily aligned with our research focus. Specifically, the content descriptors pertaining to HPE and HASS align with--and can be supported by--community gardens. This comes as little surprise as community gardens are aimed at being socially inclusive and diverse spaces where non-competitive, passive, physical activity occurs. HPE and HASS also hold culture, health, and wellbeing at the core of their learning and teaching activities. While learning areas such as Technology and Science can also align with community gardens (Bucher, 2017), their content descriptions do not specifically appear in the word tree analysis and thus were excluded from the discussion.

In sum, gardens do not only align with curriculum in numerous ways but can also support implementation of content descriptions in the classroom. This case study was positioned from a geography vantage point but applying another lens would reveal different results. By analysing the presence or use of key words with alternative perspectives, new, or differing insight into gardens use in schools could

be uncovered. This would present the opportunity to inform and devise different teaching and learning practices.

Conclusion

The model presented in this paper fills a gap in the literature by providing a replicable and accessible method for curriculum analysis. Overlaps in the Australian Curriculum and community garden literature fields are revealed through the word frequency analysis, and then unpacked for deeper conversation through word tree analysis. Our example using community gardens showed some community garden literature keywords occurred in the top 1% of words present in the curriculum and create opportunities for enriching HPE and HASS content descriptions.

Future research possibilities could include looking at the curriculum as a time series, as the new Australian Curriculum is available for viewing in 2022[6]. This would provide an insight into whether ACARA reviews reflect the shift in social values, dynamics, and weights of our current period. This would be

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[6] This paper was written and published across 2021 and 2022 and I have not actioned this recommendation yet due to collecting data for other phases of this PhD. As such, this recommendation still stands.

particularly useful in understanding terms such as wellbeing and its importance over time. This analytical model could also be used to interpret individual learning areas, such as The Arts, Science, or English.

In this paper we provide a pathway into curriculum analysis, not just for non-specialists, but for anyone interested in understanding the curriculum. As this model is designed to translate to any niche interest, it encourages us to begin merging and synthesising disciplinary discourses. By breaking down the academic barriers of curriculum analysis new paradigms can be imagined, and the core policy document of education, be improved. However, for now it is promising to understand that analysing a curriculum does not need to be an unnavigable task, should we wish to do so again.

3.2: Chapter summary

By applying my curriculum analysis model to the Australian Curriculum and investigating the role community gardens can play its delivery, it becomes evident that community gardens can effectively help educators deliver HASS and HPE curriculum. Moreover, it highlights how school-based community gardens can help tailor the nation-wide curriculum content to be relevant in a place-responsive way, while also creating food connections. This finding is at odds with many others in the literature, where scholars highlight that school-based community gardens are primarily useful for delivering Science and Maths curriculum content (Monferrer et al., 2022; Ramey-Gassert, 1997; Ray et al., 2016; Rye et al., 2012). However, it does support scholars who suggest school-based community gardens are useful for delivering HASS curriculum content (Blair, 2009; Ralston, 2011; Wolsey & Lapp, 2014).

The method explored in this chapter carves tangible pathways for scholars and teachers to begin incorporating school-based community gardens into the curriculum (thus alleviating a barrier identified in Chapter 2). By outlining their potential as place-responsive, green spaces that help teachers deliver learning area content across Years P-6, this chapter highlights the role community gardens *can* play on school campuses and emphasises how food growing enhances belonging, recognition of diversity, and connection to the built and natural environment. Thus

addressing Research Question 3: *How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?*

In Chapter 2, I undertook an in-depth exploration to uncover the benefits and barriers identified in existing literature. Expanding on this groundwork, Chapter 3 took on the task of addressing the challenge of aligning school-based community gardens with the Australian Curriculum. Now, looking ahead to Chapter 4, I will closely examine the context specific insights and perspectives of educators at TNSS (the study school), and shed light on the nuances of the benefits and barriers within the unique tropical context of the research location.

Chapter 4.0: Phase 2

Gardening, while enjoyable, is hard. There are few lessons that I have learnt in my life as great as this one. Gardening at school, as I have come to find, is even harder. Earlier in this thesis, in the literature review in Chapter 2, I explored the benefits and barriers scattered across the literature to paint a picture of what the realities were and continue to be, of school gardening. But the barriers are what really captured me. Gardens are hard to maintain, they require a significant amount of time and funding, and they are hard to weave into the curriculum. Each academic paper that I read engaged with the barriers in a consistent way – they were always the same. And while I have explored how gardens can be incorporated into learning in a way that aligns with the curriculum (Chapter 3), I haven't fully yet uncovered what the benefits and barriers might be in the school where my research was conducted. What do the teachers who I am engaging with on a regular basis think of their own school gardens? What challenges might the tropical weather pose? These were questions I had going into this phase of the research. As such, this chapter focuses on answering the first part of Research Question 2: *What are the benefits and barriers to using school-based community gardens, and how can the barriers be alleviated?* (depicted in Figure 4.1) by interviewing teachers from TNSS on the benefits and barriers they consider to surround school-based community gardens.

While this chapter explores the benefits and barriers of school-based community gardens, it also presents a new methodology for performing research with (teachers as) busy people. The methodology presented in this chapter was developed during the fieldwork phase of the research in response to the time constraints that doing research with teachers as participants presented. The consequences of responding to the constraints placed on the research resulted in an innovative, ethically informed methodology that combines the free-listing approach (Brewer, 2002; Quinlan, 2018) with the walking methodology (Heijnen et al., 2021; Lynch & Mannion, 2016; Truman & Springgay, 2018). By using this methodology new insights were gained into the challenges surrounding school-based gardening in the tropics, for example, the monsoonal weather with extreme humidity poses as a significant barrier to gardening. Moreover, it allowed me to witness in real-time the mental well-being benefits of interacting with greenspaces and how this is not only relevant for students as depicted in Chapter 2, but also for the teachers themselves. As such, while this chapter explores and presents the new methodology, it also yields powerful insights into the benefits and barriers of school-based gardening.

This chapter will first explore the role that walking interviews and free-listing approaches have played in research. Following an acknowledgement of their shortfalls I consider how they might bolster one another to create a strong

methodology for conducting research. After then presenting the actual methods for the research, I use a narrative like structure to create a way for the reader to understand the conditioned and situated temporalities we experienced, before deconstructing the findings. I conclude the chapter with a reflection on how the tropical climate of Gimuy, the place, shaped the findings and why this is important when considering the benefits and barriers of school-based community gardens.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

School-based community gardens battling food disconnection as a manifestation of Environmental Generational Amnesia

Chapter 1
Introduction

Chapter 2
School Gardens: A review on the benefits and barriers

Chapter 3
Mapping the Australian Curriculum

Chapter 4
Doing research with teachers as busy people

Chapter 5
Understanding Environmental Generational Amnesia in school gardens

Chapter 6
Pedagogy, place, and food education

Conclusion
Environmental Amnesia as food origin disconnection can be de-escalated through experiential/place-responsive learning

Figure 4.1: An overview of the thesis structure highlighting what Research Question (in this case RQ2) the chapter is responding to

4.1: Doing research with busy people: Enacting rapid walking methodologies with teachers in a primary school

Abstract

Teachers are busy people. How do we, as researchers, address the
challenges of doing research with busy people—especially if we wish
to enact ethical, more radical futures? How do we adhere to the
pressures of fast-paced urban life when research, especially interviews,
takes away people's time? This paper presents a novel method for
doing research with busy people, combining the 'walking interview'
method with a 'free listing technique.' The interviews were carried out
with teachers at a north Queensland primary school in a rapidly
urbanising neighbourhood and formed part of a larger project exploring
the barriers and opportunities of incorporating community gardens (as
important green spaces) into schools. The method itself yielded
important findings and this paper is a reflective analysis of how simple
factors such as the weather, noise, and interruptions shaped 20 minutes
of a teacher's day. We extend these ideas to explore how conditioned
and situational temporalities, along with more-than-human influences,
affect the knowledge produced in rapid walking interviews. Keeping
track of these affections can yield important data relevant to the project.

The research will be invaluable for other researchers struggling with ethical and other issues shaping access to stakeholders in a diverse range of urban environments.

Introduction

To truly enact counter-cities we need to reconsider our role as researchers in busy, urban environments. In counter-cities alternative futures are envisioned and brought to life, and socio-cultural groups establish spaces infused with hope (Dulhunty, 2023). So, how do we design research to fit into this counter-city vision, or in with a busy urban lifestyle? How to ethically make sure we do not take too much time of busy, over-researched socio-cultural groups? Time commitments are an increasing barrier for people being willing, or able to, participate in research. There are some professional groups for whom gaining access is increasingly difficult: doctors, teachers, nurses, and lawyers are just a few (Clark, 2008). Fitting in work schedules is difficult, as everyone needs their downtime, and trying to do this within the working day is even more so. Nowhere is this more evident than for health researchers during the COVID-19 pandemic, where access to professionals unfolded in the context of extreme time pressure and duress (Vindrola-Padros et al., 2020).

Although they have long existed, rapid methodologies are on the rise (Luciani et al., 2021). Rapid methodologies enable researchers to work with a participant's time constraints, adapting to busy schedules in an ethically-informed way (Clark, 2008). For the research related to this paper, rapid methodologies

proved an important way to reach teachers as potential implementors of school-based community gardens. It can be difficult to schedule semi-structured, sit-down interviews with teachers given their workload and time constraints. Moreover, some in the teaching field find value in using a collaborative approach when being involved in research (Arastoopour Irgens et al., 2023; Stewart, 2006). By actively engaging with their input and tailoring research efforts accordingly, the power dynamic between educators and researchers can be transformed, ultimately empowering teachers. The methodology outlined in this study exemplifies a joint effort to conduct research in an ethically sound manner, aligning with teachers' needs. So, to gain their views on the barriers to, and opportunities for, community gardens at their school, an innovative technique was required. The school principal, a gatekeeper who ensures the teachers are safeguarded, suggested walking and talking with teachers who were eager to participate but lacked the time, further suggesting school lunch-time duty as a suitable time/space. This simple suggestion inspired the pragmatic solution of combining a free listing technique with walking interviews.

Although the aim of the walking interviews was to fit into schedules and be ethically responsible in terms of not taking up the teacher's energy and time, the findings yielded an abundant set of evidence regarding the inclusion of gardens in schools. The method itself, and particularly the context of the research, sparked

further analysis of the more-than-human and temporal realms, and how they shaped teacher responses. Moreover, although the research unfolded as a conversation, it was also a kind of everyday 'witnessing' of how teachers engage in the ambulatory space of the school grounds (see Dewsbury, 2003). In what follows we explore how combining different interview styles, and everyday witnessing, yields a comprehensive interview method that is ethically informed (considering the needs of the participants) and finely attuned to context-specific temporalities and the more-than-human.

This paper introduces a novel approach that combines free listing and walking interviews, offering an effective method to enrich geographical and allied disciplines. In particular, for urban researchers investigating green spaces and their impact on community well-being, this paper underscores the importance of educational campuses as integral components of green infrastructure (cf. Walshe & Law, 2022). Our method is attentive to the time constraints of research subjects and can complement other research techniques to paint a realistic picture of participant's realities. As a rapid walking methodology, it also helps researchers understand how day-to-day ambulant spaces shape the gathering of knowledge. The next section explores free listing as a rapid methodology in more detail, before providing motivations behind walking interviews. The methodology section then outlines the steps conducted, and the benefits of combining the free listing and

walking interviews. Finally, narrative-like reflections on the observations made

during interviews are discussed, paying particular attention to how the temporalities

of time and space, daily interruptions, and our need for comfort are reflected within

the answers. Finally, we suggest why these considerations are significant for the

future of research in a busy world. The type of narrative-like storytelling used

throughout the discussion helps portray the scene that the listed answers and

immersive interview experiences painted. Readers may find this reminiscent of

Perec's work who also used lists to capture important details (Becker, 2001).

Free listing

Participating in someone else's research is rarely at the top of a to-do-list. Many

scholars in the health discipline have recognized this (Vindrola-Padros et al., 2020),

and transitioned to rapid methodologies to carry out research in a timely,

unintrusive manner. Rapid methodologies are the chosen methodology for only a

few research projects outside the health field. Of those that deploy this type of

research approach, most fall within the health, sociology, or technologies research

domains. Vindrola-Padros et al's. (2020) critical literature review of rapid

methodologies highlights multiple converging reasons for their emergence,

including: 1) they are time reduced (which can reduce research costs); 2) there is a

growing need for innovative research techniques and/or analysis methods; and 3)

people tend to be more willing to participate in research that requires less time. Ultimately, rapid methodologies can be a pragmatic solution to barriers that researchers face from both internal and external sources.

Free listing is a rapid methodology used mostly in ethnographic research in the Health and Sociology fields. The aim is to produce a series of 'lists' that represent an individual's mental inventory associated with a specific topic (Bernard, 2016; Brewer, 2002; Goldner et al., 2021; Quinlan, 2018). Much of the literature is based on how to undertake free listing, which quite literally requires participants to list what comes to mind when they think of a particular topic. Goldner et al. (2021) outline how free listing questions are best framed. Often it is best to keep the question as direct and targeted as possible (e.g., "Can you list all the things that come to mind regarding X"); doing so ensures lists are thematically accurate. The sequence of listed answers highlights some form of mental association and provides insight into an individuals' thought pattern (Hough & Ferraris, 2010). Brewer (2002) suggests free listing is just a recall method that is useful in getting answers rapidly, and both Bernard (2016) and Brewer argue that free listing can be applied to large or small groups and still be tested for cultural salience (a quantitative method used to measure the importance of listed answers). Many researchers agree that free listing's simple, targeted approach makes it accessible for all research subjects.

Despite its value as a research technique, free listing has yet to be readily adopted in the Education and Geography disciplines. Bieling et al. (2014), Nekaris et al. (2018), and Goldner et al. (2021) are exceptions. Bieling et al. (2014) use free listing techniques to capture substantial amounts of data where categories are participant-led, rather than predefined by the researchers (see Quinlan, 2018). Although their study is health driven, their inclusion of recreational and environmental values enables environmentally oriented researchers to gain an appreciation of the technique. Nekaris et al. (2018) use free listing to rank and better understand the effectiveness of conservation education. They use the salience analysis method, a numerical way to analyse qualitative data, to understand the effectiveness of valuable knowledge retention (Nekaris et al., 2018). Goldner et al. (2021), compare the 'free drawing' with 'free listing' to determine what method best reveals student's cultural knowledge of food consumption habits. Their findings suggest that free listing is highly beneficial for understanding commonalities in adult groups (Schrauf & Sanchez, 2010), but drawings are more engaging for children (Goldner et al., 2021). They also acknowledge that free listed answers can be exhausted quickly when under pressure to think, and important categories are missed; answers can likewise lack detail in a free listing interview. This sets precedence to combine free listing with another compatible style that can help participants relax, whilst also inspiring them to tease out all trains of thought.

This paper thus draws on research in Geography that uses walking interviews to address some of these limitations.

The value of walking interviews

Although geographers do not tend to use free listing, a walking interview is a more common Human Geography research technique where the researcher accompanies participants on a walk (Carpiano, 2009; Heijnen et al., 2021; Ingold, 2010; Kinney, 2017; Lynch & Mannion, 2016). Walking interviews differ methodologically and cross a spectrum of styles. There are go-alongs, where the researcher accompanies an interviewee on a familiar route. In the middle exists a 'walking with' style, where the participant leads the walk, perhaps drifting and with no certain agenda. At the other end are guided walks that are determined by the interviewer themselves (Evans & Jones, 2011). Each type is used for a different reason, but the type used for this paper sits in the middle of the spectrum as we neither fully accompanied participants nor determined the route ourselves (Heijnen et al., 2021; Langford & Crawford, 2022; Law, 2019; Lynch & Mannion, 2016, 2021; Mannion et al., 2013).

Walking interviews help the participant ease into the interview and attempt create a comfortable, ethical, less 'interrogative' environment (Langford & Crawford, 2022). This type of interview methodology can empower the participant,

giving them more control of the situation (Thompson & Reynolds, 2019). Carpiano (2009) suggests walking interviews can be superior to sitting down when considering social and cultural paradigms or phenomena, as they broaden the scope of individual perceptions. Law (2019) argues mobility can spark new memory and insight, contributing different but complementary perspectives to sit-down interviews. Langford and Crawford (2022) simply use them to ease participants into a natural conversational state (Langford & Crawford, 2022), which is regularly discussed by scholars enacting walking methodologies (Carpiano, 2009; Duedahl & Stilling Blichfeldt, 2020; Evans & Jones, 2011; Kinney, 2017; Kusenbach, 2003).

While this paper does not explicitly explore more-than-human knowledge co-production, we do wish to emphasise a synergistic relationship between the more-than-human realm and the temporalities of weather (de Vet & Head, 2020), time (Carstensen, 2006), and noise (Jafari et al., 2019) that emerged as themes *through walking*. Attuning to this more-than-human world, which acknowledges the interconnections and dependence between humans and non-human entities (Lynch & Mannion, 2021), requires an awareness of the affective nature the non-human world has in the co-construction of daily life/narratives (Evans & Jones, 2011; Lynch & Mannion, 2021). This awareness allows scholars to see the world differently and do research differently. In Dowling et al.'s (2017, p. 824) words, it allows us "to perform, to engage, to embody, to image and imagine, to witness, to

sense, to analyse - across, through, with and as, more-than-humans." Scholars such as Thompson and Reynolds (2019) emphasise the value of physical, visual, and verbal interruptions, highlighting how a person's daily narrative takes shape through unique, spontaneous occurrences. Interruptions can be changes in the physical context: as the place of the interview changes during walking, for example, so too does the conversation. They argue these interruptions are data and context for meaning and understanding. Thompson and Reynolds (2019) show how aversion to movement resulted in an interview that felt consistently 'stagnant'; more spatially dynamic interviews reflected a variety of embodied feelings inspired by the atmosphere/landscape (chaotic, busy, calm). While their focus on interruptions is instructive, their interviews are still quite lengthy. In urban environments, walking interviews can be particularly useful in comprehending how individuals interact with their environment as they capture real-time experiences and reactions of participants engaging with the surroundings. This provides insights into the nuanced ways in which the urban setting shapes their behaviours, perceptions, and overall engagement (Thompson & Reynolds, 2019).

As this paper sits between and across two composite (yet integrative) disciplines, Education and Geography (Brock, 2016), it is essential to highlight that walking interviews are used in both fields – though the use varies. In the discipline of Education, walking is often accompanied by other research methods. Lynch and

Mannion (2016) use walking interviews to observe the more-than-human realm and combine walking with a memory box activity. Their research deliberately evokes and examines more-than-human influences on memories, which they relate to the practice of outdoor learning. A memory box allowed them to sift through the material objects that the participants thought co-produced their learning. Heijnen et al. (2021) similarly combine walking interviews with photo-style essays which provide the researcher with a more sensually encompassing experience (Gerritsen, 2021; Middleton, 2010). Photo-style essays also allow the researcher, when not taking written notes on an interview, to recollect and analyse the narrative without relying solely on recall. What Heijnen et al. (2021), and Lynch and Mannion (2016) show through their combined methodologies is that although the walking interview has limitations (as all do), it is easily complemented.

Finally, some researchers use walking interviews for the comfort and power they provide participants. Langford and Crawford (2022) use a style of go-along interviews to encourage participants to find the confidence and power to lead the conversation. Their findings suggest that the culture of the school environment is highly influential on a teacher's wellbeing and can often determine how long a teacher will remain in their position. Langford and Crawford's motivation for the go-along method is different to others, as their use of the walking interview was not focused on the affective role the more-than-human plays. They merely used the go-

along as an enactment of ethical research that shifted the power dynamic within their interviews (Heijnen et al., 2021; Lynch & Mannion, 2016; Mannion et al., 2013).

To summarise, combining free listing and walking methodologies results in a rapid interview with many benefits. It enables understanding of cultural phenomena, identifies how knowledge is socially and contextually produced, and supplies a snapshot of routines and practices (Kinney, 2017; Thompson & Reynolds, 2019). To address the potential limitations of both walking interviews and free listing, the interviews in this paper are a combination of the best parts of both. In doing so this paper contributes new insights to the value of walking interviews.

Addressing each other's limitations

Walking interviews are often long winded and can take up a large amount of time. Though this is not always the case, there is a tendency to draw out this style of interview as we attempt to immerse ourselves in the place. On the other hand, free listing interviews are rapid and can miss meaningful knowledge and experience. In combining the two, an interview technique that is both rapid (therefore accessible) and contextually rich is created. The first major limitation of walking interviews is the inability to take notes. This can be because 1) taking notes while walking is

difficult, and 2) needing to engage with the interview mentally means note-taking takes second place (Heijnen et al., 2021). As free listing requires little engagement or prompting, the researcher is given the mental room to take notes of their surroundings. Being able to take notes or tally the interruptions increases the likelihood the researcher will remember important spatial influences on the participant's verbal dialogue (Evans & Jones, 2011; Thompson & Reynolds, 2019). It also means that things such as weather, which are important more-than-human influences (Ingold, 2010), can be recorded in real-time as well.

Free listing does not often consider the influence that the spatial environment has on participants' mental inventories. As with other free listing interviews, finding the salience (importance) of listed answers is key (Bieling et al., 2014), as it highlights the cognitive importance of answers (Quinlan, 2018). However, as outlined by Brewer (2002), lists are often exhausted before the participant has truly recalled their entire inventory. By combining with a walking interview, it becomes evident how easily lists can be influenced (either exhausted or inspired), by the temporalities of our spatial experience.

Research context and location

Our research is based at Tropical North State School (TNSS), a urban/suburban primary school in Gimuy/Cairns, within Australia's Far North wet tropics. It serves

as the focal point for a larger project studying hands-on, inquiry-based education, and school gardens in food education. Despite Gimuy's relatively lush environment compared to other Australian cities like Naarm/Melbourne or Meanjin/Brisbane, scholars Bohnet and Pert (2010) predict diminishing greenspaces due to increasing urbanisation and population growth. TNSS stands out with nearly 1000 students from Preparatory to Year 6, making it a prominent school in the region and sits in a part of the city undergoing rapid urbanisation. The campus comprises of ovals, interconnected buildings, community gardens, and ample trees (see Figure 4.2, discussed in more detail below).
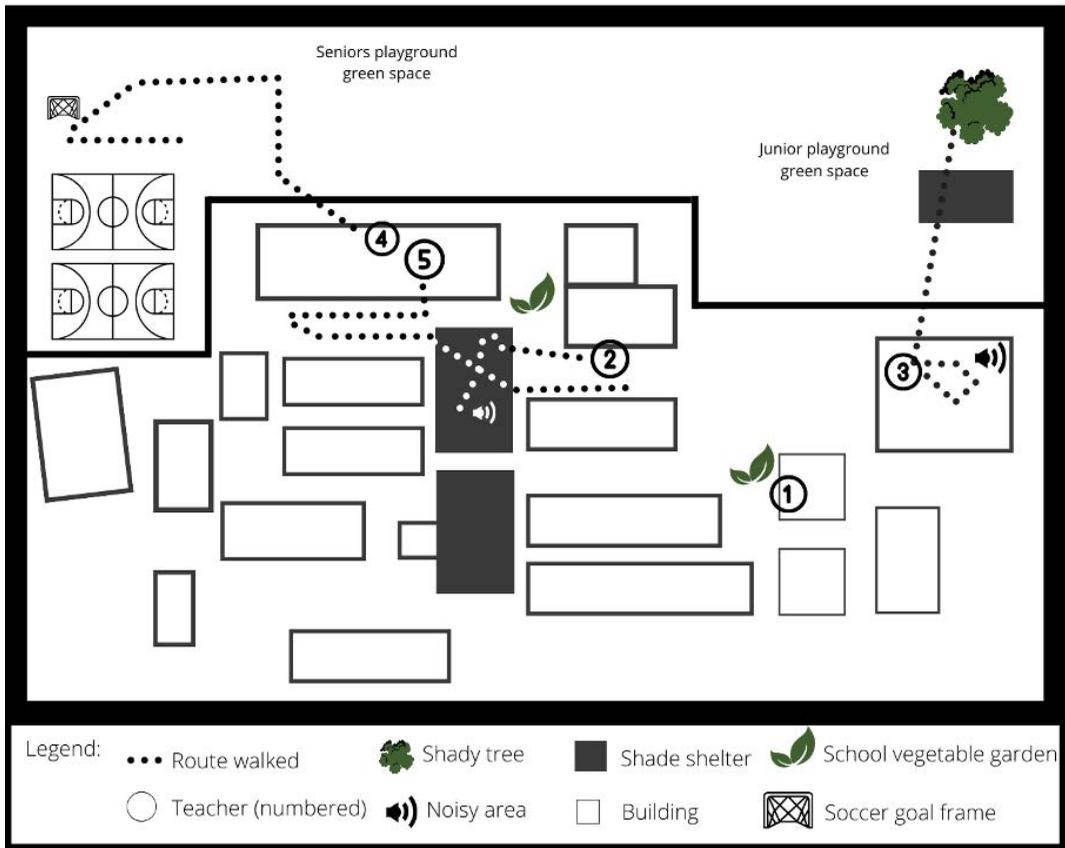
Figure 4.2: Basic depiction of the school grounds, location of the gardens, and routes of interview walking paths

The two school gardens serve primarily academic, behaviour management, and social purposes, including a lunchtime gardening club. While the broader community members (parents, caregivers, neighbours of the school grounds) are not usually actively involved in these gardens, they have the opportunity to volunteer and contribute to maintenance (such as weeding, planting, and watering). The walking interviews occurred in pre-selected areas within the school grounds,

with questions aimed at gathering teachers' perspectives on these school gardening initiatives. This paper is a product of our pragmatic research approach.

Methodology

As mentioned above, the walking interview during playground duty was suggested by the school as a viable way to conduct interviews. After ethical clearance was granted from the universities *Human Research Ethics Committee* (#H8386) the school was approached. The walking interview method was well suited to teachers who would be performing these duties and walking these routes whether the researcher was there or not; in this sense they supplied insight into day-to-day routines and practices (Kinney, 2017; Kusenbach, 2003). The lead researcher accompanied five different teachers who were eager to participate yet lacked time for the original proposal on their lunch time duties. A microphone (a ZOOM recorder) was clipped to the teacher that also picked up background noise, allowing for the lead researcher to focus on what was going on around them rather than real-time transcription. The following four questions were asked:

1) Can you list the benefits of gardens in schools?
2) Can you list the barriers for gardens in schools?
3) Can you list the benefits of inquiry-led education? and,
4) Can you list the barriers of inquiry-led education?

These questions, while relatively 'simple' in construction, probed the benefits and barriers of gardens as well as types of learning used in the classroom (inquiry-led education is a student-centred and hands-on pedagogical approach useful for engaging students in real-world learning activities (Amels et al., 2019)). The answers supplemented data from twelve semi-structured sit-down interviews that were conducted with teachers, parents, administrators, and school staff. Moreover, because free listing requires little engagement from the researcher, and the lists were recorded, the lead researcher could take observational notes. This provided a sense of comfort that no detail would go unnoticed. The rapid interview opens the research up to those with limited time, and although some researchers suggest a minimum of 30 interviews (Bernard, 2016), we agree that a minimum of 5 can still create meaningful data (Schrauf & Sanchez, 2010).

An important part of free listing analysis is measuring salience – or saturation. Salience analysis measures the saturation of data and ranks answers in terms of importance, and allows scholars to gain an understanding of whether something has a consensus within cultural, social, or professional groups (Quinlan, 2018). Because individual lists are subject to length and individual answer variations, the salience analysis method helps account for both the frequency and order of mention. This paper uses Quinlan's (2018) salience analysis calculation method. The salience (S) was calculated by ranking the answers inversely and then dividing each rank by the

total number of given answers for that specific interview. To find the composite salience value, or the mean salience for all interviews, the scores for each interview are compiled and then divided by the number of informants – which was 5 in this case. Although there are more comprehensive and rigorous equations to find salience values, this method proves reliable and easy to perform.

The following section presents the data collected and reflects on moments in the interviews that were clearly influenced by either the temporalities of the school space, or the more-than-human realm (specifically the weather). The results are a case study-like example that could inform future researchers on how to interpret the data from combining free listing and walking interviews. Thus, while a results section is unusual in a methods paper, we believe it highlights the power of rapidly and haptically collecting data with busy people. The following stories and discussions contain reflections from teachers who are referred to in a gender-neutral manner. Not only is this for protecting identity, but an ethical decision made by the authors (after discussing with the participants) to contribute to the growing counterculture that combats existing gender bias in education (Frawley, 2005).

The conditioning of time and space

The interview begins as we walk out of the teacher's classroom. They have spent the beginning of the lunch break supervising their students while they complete

their unfinished work. The teacher grabs a hat from their bag and we walk downstairs. We head straight for the school oval and are running late for lunch duty. It is an overcast day, but humidity levels are above 70% and we joke about the children looking sweaty. While listing the benefits of gardens in schools we are interrupted three times. Children are misbehaving on the play equipment and, after calling them off, the teacher returns to our interview to list the behavioural benefits gardens have. The participant suggests that gardens encourage children to relax, they are not confined to four walls all day. Then when asked about the barriers to gardens in schools, the teacher quickly looks at their half-eaten apple, holds it up and proclaims, "we're already so time poor."

We are interrupted (again). A child is asking the teacher for a pen. After instructing the child to bring the pen back the teacher begins to suggest that all their work hours actually occur outside of work. When they are in school, they are caring for these children, so anything added to their workload needs to be an extra-curricular activity. Following this, the teacher then starts to list other barriers. We begin walking over to more children misbehaving, this time they are climbing up the metal soccer goal frame. The teacher suggests, after crossing the length of the oval, that staff ratios are a barrier – there are just too many children for the number of staff the school has. The teacher is relaxed the whole time, strolling

around the school oval, and never looking frantically around. The school bell rings,
and the interview wraps up.

This section begins by exploring how time, the physical layout of the school, noise, interruptions, and weather all shaped the way interviews unfolded. Although the research did not set out to explore temporalities behind teacher responses, it became clear as the research progressed that the influence of both conditioned and situational temporalities, interruptions, and comfort was profound in not only the answers provided – but the design of the study. The above narrative reflects on time, as it was the initial driving factor for combining the interview styles, but it also reflects on how the affective space of the school grounds shaped teacher responses.

Time is both a social construct embodied by teachers and a departure point for the use of the school space. Not only was it mentioned in most of the interviews (80%) but often listed first, meaning it was the most salient (weighted) answer (n= 0.654). Time is a human-perceived organisational system that, although subject to cultural variations, dictates much of our lives (Billmayer, 2019; Carstensen, 2006). School is one of the first places where we are disciplined by the rigid structure of time, and those who operate within this space are manifestly shaped by it. The use of the school space also reflects time, as there is a distinct structure of when and

why particular areas of the school are used (Billmayer, 2019). Pathways are ambulatory, transitionary spaces, for example, and the ovals and greenspaces are associated with 'free time' for lunch, sport, or play. Classrooms are sometimes designed for the teacher to command respect and authority, with the 'desk' positioned as a longstanding material representation of that power (Billmayer, 2019; McGregor, 2004). While many may agree that schools are not necessarily the same rigid spaces they once were, the temporality of time still dictates the design and use of the space. Schools, and the bodies within them, are a modern-day by-product of the complicated time/space disciplining that has long resonated throughout western society (Dorsch, 2013).

Walking with Teacher 4 offers insights into the synergistic nature of time and space on school grounds. Lunchtime for teachers at TNSS is either spent in the lunchroom or on ground duty – a task rotated among staff. As Teacher 4 began to eat their apple on the school oval, they quickly listed the first barrier to school gardens as time: "we're already so time-poor." After an interruption, they circle back to the interview with "I'm not getting paid for this right now." On the outside space of the school grounds, and in contrast to the classroom, children have more autonomy and control and are on their 'free time', they are encouraged to be active yet there is disapproval if they become wild (Dyment et al., 2009). Teachers, although they know the value of unstructured play and less discipline during

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breaks, need respite from the classroom too. These musings remind us that although 'time' might have been the reason for free listing, there is a clear correlation between limited free time, the dynamics of outdoor spaces, the use of school grounds, and interview answers. Indeed, many researchers argue time is a significant barrier to successfully implementing and maintaining community gardens in schools (Blair, 2009; Bucher, 2017). Gardens inherently operate on their own time – you cannot rush plants to grow. This makes us wonder whether they fit in with the rapid environment of the school. Moreover, the teacher tends to hold less authority 'outside' as they are not traditionally considered 'learning spaces' (Reinus et al., 2021). If time spent using outside spaces on school grounds was viewed for its benefits and not just the students, but also teachers, then perhaps time would not be seen as a barrier.

Situated temporalities of noise and space

We are in the under covered lunch area of the junior school building; the rows of metal tables are filling up with children. We begin the interview as the children start to open their lunch boxes. The beginning of Teacher 3's interview is relatively uninterrupted, though they are constantly scanning the surrounds to ensure kids remain seated during designated eating time. The children gleefully chatter away. The noise is shrill and echoes throughout the area. As the volume rises it is

reminiscent of cicadas in the peak of Australia's summer. We raise our voices as there is a constant hum to compete with. The teacher watches the children while attributing the socialness of gardens as a benefit for students. As children begin finishing their lunches, however, their arms start to raise in the air to signal that they are done. Thus begins the interruptions. Seven children attempt to approach the teacher to show their lunch is finished. The teacher becomes distracted, turning in circles and pacing back and forth, having to signal to each individual they are allowed to go and play. Amid this, the teacher lists a barrier to gardens as being the staff to student ratio in state schools. This feels inspired by the sheer chaos that has just unfolded.

The teacher signals it is time to go to the oval to finish playground duties. It is a particularly sunny day, 31 degrees Celsius and there is little shade outside. The teacher wears a wide brim hat and instantly relaxes into a stroll. Although children are still shouting, and louder now, something seems different. As we are walking outside, surrounded by green grass, the teacher circles back and suggests that being outside is emotionally beneficial for children. On rounding out the answers, the teacher then walks past the metal shade shelter where children are playing and stands underneath the shade of a fig tree--a common tree in tropical environments and a feature of the school oval. Our interview finishes and although the noises

around us are still shrill, chaotic, and ad-hoc, the teacher is relaxed enjoying the shady environment.

Noise heavily influences mental clarity and focus. When out on the school oval Teachers 3 and 4 seemed less distracted, more attentive, and tended to ease into a relaxed rhythm. They were circling back on the benefits of being outdoors and trying to steer the 'listing' into a conversation style. In contrast, the disposition of the teachers when in the undercover areas was much more rigid. Teachers were distracted and had trouble focusing, with Teacher 2 stating "Wow, this is hard" as the volume rose around us. Teacher 1 was the calmest and the only one with minimal background noise to compete with. To reconfirm whether the lead authors memory of noise was correct, the audio files were placed in a sound editing software (Garageband) and considered in a visual way. Note the noise difference (which is basically all background noise) in the wavelengths in Figure 4.3, comparing Teacher 3 (the most distracted) to Teacher 1 (the least).

Figure 4.3: Comparison of wavelengths between Teacher 1 (left) and Teacher 3 (right)

By participating in teacher's everyday spaces and duties, the free listing interviews occurred amid noise that many scholars filter out, fail to address, or simply avoid talking about (Hall et al., 2008). In free listing methodologies with teachers (and others) this oversight requires addressing, since noise (as a situated temporality or spatial experience) directly influences participant's lists. Exposure to noise, and/or increased volumes, can significantly reduce cognitive performance and the ability to concentrate (Jafari et al., 2019). Teacher 1, who had complete silence and no interruptions for their interview, unsurprisingly had the longest list. Their list also seemed to be less influenced by their physical surroundings. Thus, perhaps the influence of noise ought to be more deeply considered when performing free listing methodologies. Without considering the exhaustive influence such experiences might have, it cannot conclusively be said that the mental inventories are representative of what that individual at that time knows.

We are influenced by the temporalities of space (Edensor, 2010) and noise is a profound part of spatial experience. Due to its synaesthetic configuration and ability to evoke memory, noise is recognised as an encompassing truth; noise becomes embedded in the body (Flint, 2021). This research was undoubtedly influenced by the chaotic, shrill noise of children, and this in itself can be recognised as powerful data. As the outside world becomes more chaotic, so too does the internal state. Although noise levels remained high, once surrounded by green spaces rather than concrete floors and metal tables, teachers showed signs of calm. This suggests noise is a situational temporality that directly influences our hourly well-being throughout the day-to-day and aligns with the research arguing stress levels related to noise are instantaneous but can also be de-escalated instantly as well (Tao et al., 2020). Moreover, research shows that connection to greenspace and outdoor environments increases attention (Tennessen & Cimprich, 1995), and decreases stress levels over time (Ohly et al., 2016). Thus, despite all the barriers, community gardens can be calming green spaces that contribute to a more focused, peaceful atmosphere. In the next section, the physical spaces of the school campus are explored as shaping interview narratives.

Interruptions are productive

Power is an important part of routines and is found within daily disruptions or interruptions (Thompson & Reynolds, 2019). It was obvious that, being in a busy school ground during lunch time, there would be ample interruptions while the teachers attempted to go about their jobs. For this reason, the lead researcher observed and recorded instances that could be seen to 'interrupt' the flow of the interview. The instances observed were a culmination of more-than-human (weather, noise, etc.), and human interruptions. Below we reflect on the interruptions as valuable points of data, before exploring weather as a more-than-human influence on our need, and quest, for physical comfort.

Interviews occurred in various locations across the school grounds where teachers were doing lunchtime duty. Figure 4.2 above shows the school grounds and the routes walked for each interview. The physical location of the interviews tended to also shape the length of the free lists. Teacher 1, who was stationary, provided the most comprehensive list. Teacher 5, who was walking mostly along pathways, gave the shortest list. Teacher 5's interview also had a steady stream of interruptions, which reflected the number of people who we passed. Observing these interruptions shows how knowledge can be co-constructed by the spontaneously changing narratives we have to both people and place (Duedahl &

Stilling Blichfeldt, 2020; Thompson & Reynolds, 2019). While place relationships are rarely considered in free listing literature, when paid attention to they yield surprising insights. In this research they provide an example of how mental inventories are affected by location.

While many interruptions were short, some took extended amounts of time and required focus/attention from the teacher. Mostly these occurred in the undercover area where noise resonates the most; or on the pathways, which are transitionary spaces where brief interactions are expected to occur. The interview with the least number of interruptions was with Teacher 1, as seen in Figure 4.4 where they chose to sit down as the children played. This difference highlights that when given more space to think, or a quieter environment, teachers can give their thoughts more space and stay on topic. While some may view fewer answers from other participants as a hindrance or limitation to the interview, the prevalence of interruptions emphasised the power of ever-changing daily narratives on concentration (Thompson & Reynolds, 2019).
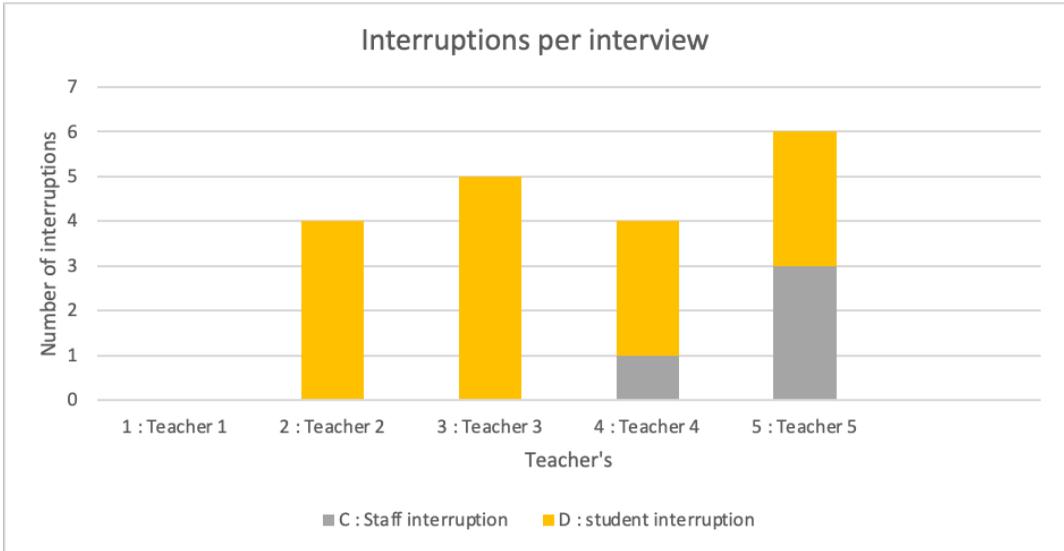
Figure 4.4: Interruptions in each interview.

The interviews were interrupted on average 2.8 times and each time concentration was broken a new narrative was introduced. Indeed, Thompson and Reynolds (2019) suggest that bearing witness to these interruptions offers insight into how daily narratives are always shifting and colliding. In this research, witnessing interruptions for just a fleeting moment of a teacher's day highlights the pressure teachers are constantly under and why staff ratios may have been included as a listed answer.

A quest for comfort – thermal regulation in the tropics

There is silent anticipation hanging in the air. The lunch bell finally rings. A repetitive whooping. Doors fly open and aircon spills out onto the pathways - a

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welcome contrast to the pressing heat. Children rush to their bags and the noise begins to rise. A chorus of shrill voices and drumming chatter sweeps and echoes throughout the shed-like undercover areas. It bounces from concrete floor to metal ceiling and back. The children sit themselves down, crammed under a shade shelter like sardines in a can. We're all avoiding the harsh tropical sun. The air is hot and heavy, clinging to small bodies layered in uniformed polyester. It is 31 degrees with a humidity level of 80%. We are all aware 'build-up' [a rapid increase of humidity and heat before the monsoonal shift] season is here. The end of the year is swiftly approaching.

There is a buzzing lunch time excitement. Walking towards an undercover area where the children are sitting to eat their lunch, Teacher 2 and I begin our interview: "Can you list the benefits of gardens in schools?" As quickly as we start, we are interrupted. A young student is crying. Their mother forgot to buy them an ice cream from the tuck-shop. "Perhaps tomorrow" says the teacher, patting the small child on the back. Damage control for wild emotions. All part of the teacher's job. We circle, raising our voices to compete against the children. Distracted by the chaos around us and trying to keep an eye on the 360-degree raucous scene, the interviewee slips in and out of focus.

Just as the sweat forming on their brow begins to bead down, they state "the weather is a barrier to gardens." The list of answers begins to slow. The hot air makes everything harder, hazier. So, we move on. "Can you list to me the benefits and barriers to experience-centred, or inquiry-based, education?" Another interruption. This time it is a green ant inside a glue stick container. Its captor, a young child, is determined to keep it alive. A strange occurrence. Though children can often be surprising. The teacher laughs. Lizards were the craze last year. We begin to talk again as the teacher peers with a glazed expression at the concrete ground, their answer is guided by the surroundings. "Children need concrete learning, it's concrete, in their hands." They snap back to attention as the children begin leaving the sheltered area "Hats must be on" they yell, forgoing the answer they were forming. Inspired by the behaviour of the children, the teacher lists behaviour, and staff ratios as barriers. A young student brings their lunch container up to us, the teacher attempts to shut it and fails. "Just keep it in the fridge." Before we can refocus another student is making sure the teacher emails their parents, reminding them that they've been good recently. With pride across their face, they scurry off with reassurance that an email has been sent. The interview ends. Their mental inventory of benefits and barriers is exhausted, and from their lunchtime duties, they appear to be as well.

Humans, whether we accept it or not, are creatures of comfort and often seek it out (Sleegers & Proulx, 2015). One aspect of life we struggle to find comfort in is the weather. Weather shapes our daily lived experiences (Ingold, 2010), and nowhere is this more prevalent than in the build-up to the rainy season in northern Queensland. The walking method places researchers in the same climatic conditions as the participants daily realities, helping us to identify and understand the nuances behind their reflections and actions. Teacher 2 listed weather as a barrier, reflecting on their discomfort with the pressing heat and humidity (above 80% humidity) – yet did not mention the weather in their longer supplementary sit-down interview when they opted for it later. Teacher 3 sought shade from a tree, engaging with the natural landscape to ease discomfort. Once in the shade, Teacher 3 reflected further on the benefits of being outdoors, eagerly trying to engage in a comfortable conversive style. Teacher 1 simply took a seat just inside the door of the classroom, in quieter area with air conditioning where they could still see the children playing (something we have been assured the teacher does regularly to cope with the heat of the tropics). Ironically, in seeking comfort of the air-conditioning Teacher 1 is hindering their adaptability to such thermal conditions (Wang et al., 2020). This comfort is yet another reason behind Teacher 1's list was longer than all the other participants and why, when in a cooler environment, Teacher 3 began to feel more inclined to retrace our (figurative) steps and answer previous questions.

If we had just considered the free listed answers as a normal free listing survey would do, weather would be a negligible response – and yet, it had an underlying influence over all participants' answers and actions. While weather was very evidently embodied in every interview, it has one of the lowest salience scores (n=0.2). In witnessing their quest for comfort, we were able to reflect on the importance that extreme weather and thermal conditions pertain regarding outdoor activities in the tropics (Schweiker et al., 2018). Moreover, without experiencing it alongside them, it is hard to gauge just how scattering and draining the humidity of tropical North Queensland can be. It is for reasons such as this that combining the free listing and walking methodology yielded unexpected benefits.

Some scholars performing walking methodologies consider the weather as a barrier to interviews (Carpiano, 2009; Kinney, 2017). However, Ingold (2010), Lynch and Mannion (2016), and Barry (2019), recognise its intrinsic more-than-human value; we are entangled with the weather, and it is the underlying factor in everything we do. In the context of the broader research, the weather poses a massive barrier to running successful community gardens. With alternating wet and dry tropical conditions, coupled with extreme temperatures and humidity for half of the year, using gardens as outdoor classrooms is profoundly challenging and not in the least bit comforting. Considering this barrier in future research, regardless of the mental comfort greenspaces provide, is paramount.

Conclusion

Walking interviews are powerful tools for examining the intricate occurrences of human interactions in their social and environmental context. When combined with other research methodologies, such as free listing, they provide deep insight and work within the time constraints of busy communities. This unique methodology contributes to the discourse of counter-cities by challenging traditional research methods and providing a deeper understanding of the often-overlooked facets of urban life. In the city of Gimuy (Cairns), it provided a new way to think about the importance of green spaces in a rapidly urbanising/expanding neighbourhood and city. The research elucidates the value of having green spaces (such as school gardens and trees) in suburban/urban environments, notably by improving the well-being of those who engage in them.

Combining free listing and walking interview techniques enables access to the lived reality of workplaces. Workplaces, for the most part, are often inaccessible spaces for researchers and are thus an underrepresented social and cultural domain. This is especially true in primary schools, where there is a pressing need for immediate attention to children. This dynamic leads to a hectic atmosphere for teachers, especially those engaged with young children. This rapid method provided important access to busy teachers in their workplace--a vital cultural and

social realm for understanding the realities behind school-based community gardens that would otherwise remain out of reach. Furthermore, the methodology developed here helps address the challenges of gaining entry to workplaces and environments where children are present. Our methodology thus enabled new ways to engage with workplaces and children. Our analysis, although using a small sample, yields meaningful data.

In trialling free listed, walking interviews in a Far North Queensland primary school, we found that the situated and conditioned temporalities, alongside more-than-human elements such as the weather, directly influenced participant's responses. Researchers using walking interviews often consider observations of the more-than-human realm an important dimension of the interview. We argue that combining these methods promotes the witnessing of the more-than-human impact on verbal dialogue as well as culturally salient domains, or rather, the construction of knowledge. This is valuable in understanding how unconscious most of our decisions and understandings tend to be. Using a free listing style, which requires little engagement while the interviewee is speaking, allows the researcher to split their focus and observe the participant within their surroundings, whilst ensuring they can accurately recall the interview by taking notes. We also note that this methodology resulted in a sense of comfort for the lead researcher who faced difficulties in taking notes while on the move. The free listing technique and

recording provided relief by eliminating the need for detailed handwritten field notes. These simple, yet creative, implementations in the interview process allowed the researcher to focus on noting instances of interruption or observing the teachers more closely.

Geographers can benefit significantly from experimenting with rapid methodologies like free listing. These methods not only complement conventional research and interview approaches but also open new avenues for research. In the fast-paced and occasionally chaotic urban environment, particularly within urban schools with high student populations, the rapid walking interview technique allows researchers to explore the city's ambulatory spaces and the individuals operating within them from a unique perspective. Researchers face various challenges -- including time constraints -- but by accommodating participants' schedules as we did in our research, we can continue to ethically uncover rich personal narratives, without disrupting daily lives.

4.2: Chapter Summary

In conclusion, the tropical climate of Gimuy, serving as the backdrop for this chapter, emerges as a pivotal factor in shaping the benefits and barriers of school-based community gardening at TNSS. The impact of the harsh tropical weather conditions on daily life, as revealed in the findings, underscores the importance of understanding the regional context when considering the dynamics of outdoor spaces. The mental reprieve experienced amid the greenspaces on campus, reported by teachers and reflected in their calmer demeanour, contrasts sharply with the challenges posed by gardening under the relentless sun—an aspect often overlooked in existing literature (as far as I can ascertain). This forces me to consider how the interplay of time and weather as barriers adds a nuanced layer to the discussion, with the limited time for school gardening often coinciding with the sun at its peak, something not previously explored by other scholars.

This research prompts a re-evaluation of perceived barriers to school-based community gardens. In it, I suggest that recognising the value of outdoor spaces for both students *and* teachers could reshape perspectives on the constraints of time. This shift challenges traditional notions and calls for a reconsideration of the role of outdoor spaces in the fast-paced environment of schools. Thus, the experience gained from conducting this research, and its findings, significantly contribute to

answering Research Question 2, offering valuable insights into the region-specific challenges and benefits associated with school-based community gardening.

Thus far, this thesis has created a picture of the complexities involved in maintaining a successful community garden, and the benefits they pertain. Their challenges and ways to overcome them was identified in Chapter 2, and their alignment with the Australian curriculum in Chapter 3; and this chapter (Chapter 4) observed the tangible impact they have on the TNSS campus and its inhabitants. Now, the trajectory shifts towards investigating their potential role in de-escalating the phenomenon of EGA. As such, the upcoming chapter aims to discern if manifestations of EGA exist at TNSS and whether they correlate with food origin disconnection.

Chapter 5.0: Phase 2

The concept of Environmental Generational Amnesia, or EGA, is rooted in a psychological phenomenon that stems from the diminishing connection between successive generations and wild, natural spaces, along with the opportunities they offer (Kahn, 2002). It can be seen as first and foremost, a physical access issue, as many children nowadays encounter only meticulously groomed environments, contributing to a generational forgetfulness of what unspoiled natural surroundings entail. As each new generation, including my own and those before, comes into existence amidst a shifting climate and environment, the baseline of what is considered 'natural' gradually evolves (Kahn, 2002, 2022). Kahn (2002) suggests, however, that this phenomenon has also led to a state of complacency. As successive generations grow up without a full understanding of what has been lost, they perpetuate a cycle of environmental forgetfulness, contributing to a rapidly changing world.

Manifestations of EGA are currently recognised to include poor moral affiliation towards the natural environment (Kahn, 2002), limited motor skills (Kahn & Weiss, 2017), and place disconnection (Kahn, 2022; Kellert, 2002). I use the common understanding children that do not know where there food comes from (Cairns & Johnston, 2018), and the generational and physical divide existing

between farmers and urbanites, to interrogate whether food origin disconnection can be considered a manifestation of EGA as well. Thus this chapter addresses Research Question 1: *Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at TNSS?* (see Figure 5.1).

This chapter aims to interrogate the phenomenon of EGA. It does so by amassing the various manifestations discussed in literature and contributes new insights that further the thinking about potential manifestations of EGA. Interviews with parents, teachers, administration staff, and other members of the school community are drawn upon to investigate whether EGA is perceived to be manifesting at TNSS, and then to deconstruct how these manifestations might be overcome. I use the school-based community garden as a setting for exploring these opportunities of de-escalation, highlighting how gardens act as educational sites of place and food exploration (Kadlec, 2006). I conclude this chapter with a reflection on the main findings, before posing the importance this chapter plays in setting the scene for the following Chapter 6.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

School-based community gardens battling food disconnection as a manifestation of Environmental Generational Amnesia

Chapter 1
Introduction

Chapter 2
School Gardens: A review on the benefits and barriers

Chapter 3
Mapping the Australian Curriculum

Chapter 4
Doing research with teachers as busy people

Chapter 5
Understanding Environmental Generational Amnesia in school gardens

Chapter 6
Pedagogy, place, and food education

Conclusion
Environmental Amnesia as food origin disconnection can be de-escalated through experiential/place-responsive learning

Figure 5.1: An overview of the thesis structure highlighting what Research Question (in this case RQ1) the chapter is responding to

5.1: *Understanding Environmental Generational Amnesia through urban school garden learning experiences in Gimuy/Cairns, Australia*

This paper explores the potential role of school garden learning experiences in remediating Environmental Generational Amnesia (EGA). EGA is a generational type of environmental forgetting brought about by prolonged disconnection from 'natural' landscapes, with symptoms manifesting as poor motor skills, deficient food origin knowledge, a lack of environmental moral affiliation and undeveloped connections to place. Drawing on interviews with teachers, parents, counsellors, groundskeepers, and administrators at a Far North Queensland primary school, this paper explores how school garden learning experiences foster interaction patterns that combat EGA's symptoms. We find that urban school gardens offer new possibilities for reassembling students into more-than-human local ecologies in ways that can remediate the manifestation of EGA.

Introduction

Urbanisation is a key feature of the Anthropocene, with many urban dwellers now physically and mentally removed from 'natural' landscapes (Kellert, 2002) and the agricultural practices that provide human sustenance (Head, 2016). This disconnection leads to a particular form of collective amnesia that Khan (2002) first identified two decades ago. Environmental Generational Amnesia (EGA) is a disassociation with the natural/environmental realm and a perception of nature that needs it to be 'big' or 'pristine' to be recognised and classified as 'nature[7]' (Kahn, 2022; Kahn, 2007; Kahn & Weiss, 2017; Kellert). This paper recognises children as susceptible to EGA without tangible contact time with more-than-human ecologies, such as the plants, animals, and critters in the city. This more-than-human world is made up of intricate connections and mutual reliance between human and non-human elements within the urban environment (Taylor et al., 2012) although without involved contact it can seem invisible.

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[7] We are acutely aware that the nature/culture dyad is exacerbated by referring to non-human counterparts explicitly as 'nature'. This paper thus positions culture as an embedded part of nature. Following the Greek origin of the word 'nature', we recognise that nature is anything subject to the spontaneous process of growing and/or producing, a process that humans are themselves part of (Ducarme & Couvet, 2020)

Gardens are spaces that can address this, and where humans and non-humans come together with a shared goal: assembling co-creation (E. Sarmiento, 2017). The research charted in this paper explores how one garden in a Gimuy/Cairns primary school, referred to as Tropical North State School (TNSS) (pseudonym), engages this process by offering everyday environmental encounters and assimilating children into a garden assemblage. Research exploring EGA is limited to a small number of studies that examine how to 'de-escalate' EGA. The language of de-escalation has the tendency to be alarmist and universalise experience; instead we deploy the term 'remediate' to allow for differing encounters with EGA. Moreover, the research presented here narrows the focus to examine how school gardens as learning spaces can remediate the manifestations of EGA.

Our paper thus builds upon scholarship that charts EGA symptoms but is novel in that it goes beyond existing research to explore the potential role of school gardens in remediating them. Indeed, we extend existing scholarship to question whether food origin disconnection might be a missing manifestation of EGA in the literature. We also recognise that Kahn (2002; 2022) sometimes unwittingly reinforces the dichotomy between humans and nature; here we aim to acknowledge the intricacies of a more-than-human framework, one that encompasses plants, animals, technologies, and children. In what follows, we are thus conscious of

language choices surrounding 'nature' and 'the environment' to acknowledge the more-than-human world. In what follows we present the context and research methods used for conducting this study, before delving into and critiquing the literature that discusses EGA's manifestations. We then explore potential ways of remediating EGA discussed in the literature, and analyse our own research findings to suggest opportunities for EGA remediation through school garden interactions. Finally, we discuss the implications of using gardens for academic, social and environmental agendas, reflecting on the unique lessons that can be learnt from TNSS.

Context and methods

Although the Gimuy/Cairns region has undergone significant urban development in recent decades, it remains relatively green/lush as it sits in a protected and ecologically significant corridor: between the World Heritage-listed Daintree Rainforest and the Great Barrier Reef. TNSS sits amidst these natural wonders in a large school catchment (depicted in Figure 5.2) which has seen an influx of families with school-aged children. The area is home to many new master-planned residential estates which are displacing semi-forested, vacant, and less viable farming land. With a total attendance population of almost 1000 children, from Preparatory to Year 6, TNSS is considered a large primary school.

Figure 5.2: Four satellite images of the TNSS catchment region from 2002 to 2022, showing the development undergone in the region in the last two decades. Sourced and adapted from Google Earth (2023)

TNSS has two learning streams, one Montessori-affiliated, and one a regular state school stream. The regular school stream uses mostly explicit instruction pedagogies where the teacher leads most aspects of the lesson (O'Neill et al., 2013). The Montessori-affiliated stream instead relies on experiential/place-responsive pedagogies that are child-led and respond to and work with the natural environment (Lynch & Mannion, 2021). TNSS has two gardens that mostly act as sites for learning. For example, the Montessori affiliated stream spend one entire day using the garden as their English, Maths, Science, Arts and Humanities learning space; the Digital Technology class uses gardens for enhancing farm-to-plate knowledge; and lastly gardens are used to engage at-risk or disempowered youth. The school also has a gardening club and beautification program, where members of the public (alongside school children) can weed, water, and look after the flora around campus. In 2021, the school initiated a native species planting project to restore a school wetland area and combat annual seasonal flooding. Finally, the school is in the process of building a market garden, where the entire school community will participate in the growing of fruits and vegetables to provide fresh produce to the school tuckshop and to sell to parents and the community.

The research for this paper analyses fifteen semi-structured and rapid walking interviews (Walshe & Law, 2024) with two parents, seven teachers, a religious instruction educator, two guidance officers, the school Principal, one teacher aide, and the groundskeeper. Interviews with adults were chosen as the primary means of data collection as most studies engage with children and explore EGA through their viewpoints and perspectives (Kahn, 2002; 2022). Our research is the first to understand adult perspectives regarding the manifestation of the phenomenon in children, and a diverse group of participants were selected to gather a wide range of perspectives. Interview questions were formulated using examples from both school garden and community garden literature such as Wake and Birdsall (2016), Hardy and Grootenboer (2013), Bucher (2017), Datta (2016), and Bice et al. (2018). Interview questions enabled participants to reflect on their own experiences and the themes of EGA.

Interviews were advertised on the school's social media site and internally through the school administration. Interviews were recorded using a Zoom field recorder and run through the transcription program Otter.ai before being thematically coded using the program NVivo 12. Following Boyatzis (1998) and Soutter et al (2012) the research deployed deductive and inductive techniques to understand pre-conceived and emerging themes relating to EGA. Interview transcriptions were explicitly coded for impact on *motor skills*, **environmental**

disconnection, and <u>emotional development</u> (key themes of EGA). An example

from one interview provides an illustration: "I think that students, or just **people in**

general, are getting more removed from the natural world. And I think and

especially children, **spending so much indoor time now** […] I see it in their *gross*

motor skills […] I think there's <u>connections to cognitive as well as emotional</u>, your

whole development." We further implicitly coded the transcripts by analysing the

contextual nuances surrounding explicit mentions of key words, extracting

additional layers of meaning such as positive or negative connotations, as well as

associations with other thematic elements. This process was then cross-referenced

with Kahn (2002; 2022) and Kahn and Weiss (2017) to identify correlations with

findings and outcomes.

Identifying and remediating EGA

In this section we review the EGA literature, paying particular attention to the

origin and causes of EGA, how it manifests and its remediation. Interwoven

throughout are perceived[8] instances of EGA at TNSS to help contextualise the

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[8] Gender-neutral language is maintained when referring to interviewees and the children they refer to. This is an intentional ethical choice made by the authors to respect the identities of participants and as a defiance of the gender bias that exists in both the environmental (Ossana et al., 1992) and education disciplines (Frawley, 2005).

research. We explore known ways for remediating EGA found in the literature and discuss the potential of school gardens in remediating it. We argue that using gardens as learning spaces gives children opportunities to engage in meaningful nature and place-based experiences that enrich their affection towards the environment, increase motor skills, and improve their food origin awareness.

Although few scholars specifically explore the concept of EGA, we consider it a valuable framework for our research. EGA was initially introduced to elucidate the psychological ramifications of limited exposure to natural environments and how this leads to a collective forgetfulness (Kahn, 2002). EGA bears resemblance to the shifting baseline syndrome (Mora, 2015), yet underscores the notion that our evolving perceptions of a changing environment are shaped across generations. Children not only undergo environmental disconnection through their day-to-day experiences, but also inherit a declining understanding (from the previous generation) of ecological standards for what constitutes a 'normal' environmental or natural experience.

Most EGA research concentrates on regions such as North and South America and the United Kingdom, while exploration in Australia is lacking (Kahn, 2002; 2022; Kahn & Weiss, 2017; Mora, 2015). Scholars investigating EGA span various disciplines, from technological studies (Kahn et al., 2009) to environmental

management (Boyd & Folke, 2011), and extend to coral reef and marine studies for insights into shifting baselines (Mora, 2015). Most researchers delve into understanding children's perceptions of the natural world (Kahn, 2002; Kahn & Weiss, 2017; Kellert, 2002), examining how the disappearance of green spaces in urban settings hampers and creates less opportunity to interact with what Kahn refers to as 'big nature' (uninterrupted spaces such as National parks [2002]). This affects children's ability to appreciate nature's value, resulting in a 'disconnection' from it. Thanks to Kahn's (2002) pioneering research, we can identify tell-tale signs of EGA. In children EGA manifests as poor motor skills (Kahn & Weiss, 2017), limited environmental moral affiliation (Kahn, 2007, 2022), and place disconnection (Kahn, 2002; Kellert, 2002).

EGA as limited or poor motor skills

Motor skills are not inherent; they are a developmental outcome gained through experience. Researchers suggests limited outdoor interaction results in less opportunity to engage in practices such as walking on uneven surfaces, digging, standing, climbing, running, and jumping (Kahn & Weiss, 2017). Without these experiences, kinaesthetic memory is reduced and can result in an inability to instinctively protect ourselves when we fall. Children who do not trust their bodies to know how to climb or where to place their feet to support themselves lack

experiences that build these skills. Kahn and Weiss (2017) argue motor skills are learned through interacting with 'big nature', and evolve from a wide array of movements and experiences. We think declining motor skills also stem from children's limited opportunities to *actively participate* in natural settings (and not just 'big' settings, outside of cities). Gardens afford this opportunity through digging, planting, pulling weeds, walking around and watering garden beds, building fine and gross motor skills. Indeed, Kahn (2002) previously noted that children have fewer and fewer chances to actively participate with, explore, play, and experience nature at their own pace and in their own manner. Malone (2007) similarly argues that children's freedom is increasingly restricted, leading to a generation sheltered from independent nature play, away from parental supervision. Even teachers at TNSS referred to the 'bubble wrapping' of children in relation to their nature-based experiences. Overly protecting and coddling children thus exacerbates EGA; it is imperative to have multiple opportunities to develop and hone skills in childhood. As one teacher at TNSS expressed:

> *I set up a circuit where they [could] be involved in climbing, jumping,*
> *and balancing. So just for their gross motor skills. And some children,*
> *well you can see they've never really played on playgrounds, or*
> *they're scared to climb up the ladder, turn around, and go back down*
> *backwards. Their minds are going, where do I put my hands? My*

feet? That's something that makes you think if children have been

outdoors, not even playgrounds, but if they've been climbing trees,

then traditionally they've got all that, they have gross motor skills –

Teacher 2

EGA as limited moral affiliation

Environmental moral affiliation is evident when children extend the same moral

relationships they have with humans to their non-human counterparts such as trees,

birds, and plants (Kahn, 2022). Morals in this sense are standards of behaviour that

reflect the importance of the wellbeing of plants and animals, and their just and fair

treatment (Kahn, 2022, p. 76). Children's morals are not taught directly but are

affectively developed through personal encounters with non-humans (Malone,

2016) and evolve during the developmental years from 0-8 years of age. On the

other hand, limited moral affiliation looks like a lack of respect towards the natural

environment, through acts such as intentional vandalism or harm, and children

lacking this respect show signs of EGA (Kahn, 2002). Kahn (2002) suggests that if

children grow up in environments with excessive trash or vandalism, for example,

they come to expect this as the norm. De Veer et al. (2022) similarly propose that

children do not consider litter in concreted, built-up areas as environmentally

damaging but do if the litter is at a beach or in a park.

Participants identified the manifestation of EGA in TNSS students through witnessing their poor moral affiliation towards nature. One teacher aide was particularly sceptical about people's attitudes towards the garden: 'I don't think they'll care enough to [treat it with respect], and it'll just be destroyed.' Some interviewees suggested children expressed signs of poor moral affiliation by vandalising their environment.

> *I think if they can be more aware of the environment and think of the flow on effects of how they treat it, by not throwing litter out their windows (Maccas packets), and all that crap [...] then they can hopefully treat it with a little bit more respect – Grounds keeper*

> *Yeah, vandalism, and trying to ensure that people respect it [the gardens]. That they don't get in there and trash it out of hours, or even in school hours [...] that people have respect for it. I think that would be the biggest barrier – Teacher 6*

These reflections show a generalised worry about children's moral affiliations towards the surrounding environment – a lack of respect without fairness or justice. Some children even treat the local environment as their personal trash can. Because Gimuy/Cairns is the meeting place for two World Heritage-

listed sites – the Daintree rainforest and Great Barrier Reef-- pro-environmental attitudes are encouraged in both schools and the broader community. The school has a Beautify My Neighbourhood program where children and residents are encouraged to pick up litter, for example, and local storm drains have been stencilled with fish and 'save the reef' messaging by a local environmental organisation. The drains highlight that litter anywhere in the city eventually flows through the stormwater system and directly to the Great Barrier Reef. To witness vandalism and disrespect suggests that the messaging is still not sinking in.

EGA as place disconnection

Place disconnection is considered a manifestation of EGA. Place disconnection means children do not perceive their surrounding environments as nature (Kahn, 2002), even though everything around them, including themselves, their food, and the weather, is nature. It is only through tangible, everyday experiences with the outdoors that humans develop a deep understanding of their local environment (Law, 2019). More-than-human encounters provide visceral memories for people to draw upon, helping shape their environmental knowledge and understanding of place. Without these encounters it is difficult to recognise shared existence and similarities. Ensuring children feel a connection to place is vital as they age because place attachment and connection have been linked to higher levels of personal well-

being and development (Afshar et al., 2017; Albers et al., 2021; Altman & Low, 1992; Basu et al., 2020; J. 'Yotti' Kingsley et al., 2009; Scannell & Gifford, n.d.). While some scholars discuss the inadequacies of understanding place, here we expand this discourse by examining the particular disconnection from wet, tropical environments such as Gimuy/Cairns.

At TNSS, students suffer from place disconnection. This occurs for a variety of reasons, but the Principal believes it begins with the removal of green spaces, 'the way we're living, and the development of the suburbs, we've just got less and less [nature].' Although Gimuy/Cairns is a lush city, the suburbs where TNSS is situated are experiencing rapid urban development. Places that were once rainforests and important habitats are now mud or dust pits making way for housing and supermarket chains. For example, a small section of rainforest near the school was recently bulldozed to make way for a new shopping complex. By witnessing the removal of these spaces, children are conditioned to view nature as something 'in the way' of human development *(see also* Freeman et al., 2015; Nisbet et al., 2020). In fact, Bohnet and Pert (2010) forecast that if urbanisation and population growth continue their current trajectories in Gimuy/Cairns, this will leave the city with far fewer greenspaces and even less opportunity to engage in nature play. Teachers already recognise reduced opportunities, with Teacher 2 suggesting 'children need to touch it [nature] and engage [with the weather] … Because here is

so different from Brisbane or Darwin.' Teacher 6 similarly claims 'They [the children] don't actually understand that when you're looking at texts for kids [for winter], that it wouldn't be a dry season like we have here, it would be about snow.'

Because the Gimuy/Cairns tropical climate contrasts with most of Australia's populated centres (Figure 5.3), teachers expressed concern about children learning Euro-centric temperate seasons (summer, autumn, winter, spring) which do not align with the reality of the local climate. Although TNSS teachers do communicate how the local climate varies, many suggested it can be hard for children to conceptualise. In temperate climates, Euro-centric seasons make sense, but the northern tropical regions of Australia experience alternating hot, wet and dry seasons. Indeed, Gimuy/Cairns holds more significant similarities to our neighbouring tropical monsoon belt countries than to the rest of Australia. Learning tropical seasonality is a vital part of connecting to place, and learning appropriate seasons in school and experiencing them in the garden assemblage can be an important way to remediate EGA.
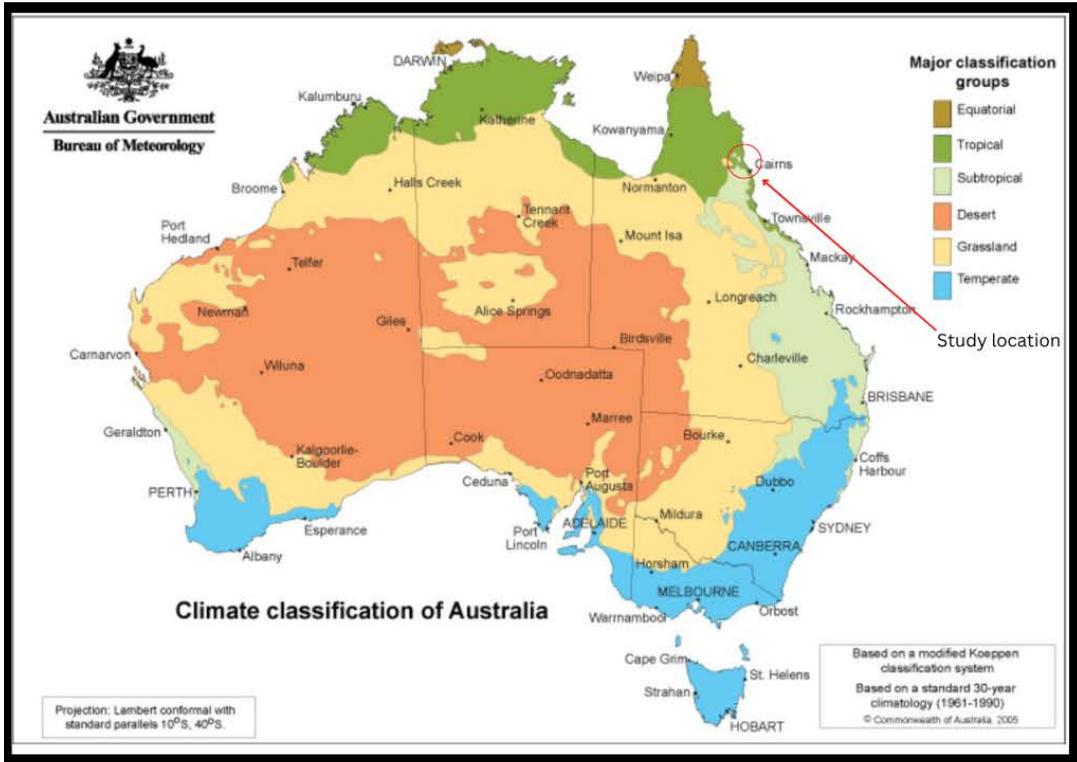
Figure 5. 3: An adaption of the Köppen Climate map from the Bureau of Meteorology, (2022) depicting Cairns local climate

EGA as deficient food system awareness

Finally, EGA can manifest as deficient food system awareness. To our knowledge, no scholar has linked EGA to food origin disconnection, although there are points of convergence between EGA and other scholarly debate. Uhlmann et al. (2018) depict food disconnection as a form of amnesia, exploring how urbanites are removed from the spaces and processes of food production which results in a low awareness that food is 'nature'. Together with Grafton (2020), they emphasise the

importance of gardening and growing food for individual consumption to build awareness and an ethics of food and the environment in which it is grown. Not understanding where food comes from or how it grows is not just a problem for children; it is a problem that holds massive ramifications for the future of food systems (Vileisis, 2008). While some may argue that food knowledge in children is shaped by parents, schools play a vital role and have duty of care in shaping this awareness (Goldner et al., 2021). Routinely buying food from the grocery store or having no interactive experiences with growing it suggests children are not in contact with their local food systems (Uhlmann et al., 2018). This is the gap schools can fill with informed, hands-on learning.

Some interviewees at TNSS were vocal about how children are physically and cognitively disconnected from their environment, suggesting that a physical disconnection from the processes involved in growing food leads to children not recognising the origins of their food. 'Kids nowadays are out of touch with food', suggested Teacher 4, and Teacher 2 (sadly) outlined how 'some children don't realise that milk comes from a cow, or that farms produce food for us.' Moreover, Parent 2 attributed this disconnection to the presence of supermarkets and childrens over exposure to them: 'I think that children need to learn about food creation and food preparation. Not just for their self-sufficiency but to understand where their food comes from. It doesn't just grow in the supermarket.'

In sum, EGA manifests at TNSS and participants suggest it stems from limited active, outdoor participation. This in turn affects day-to-day well-being, motor skills, moral affiliation, place connection, and food origin/system awareness. Before examining how TNSS school gardens remediate symptoms of EGA, we first review the remediation perspectives outlined in literature.

Opportunities for remediating EGA

Remediating EGA requires meaningful and participatory contact in an environmental assemblage. One of the most viable techniques to remediate EGA is to develop an interaction pattern repertoire (Kahn and Weiss, 2017). Interaction patterns are recognisable when one does something repeatedly until the movement is added to their mental and physical vocabulary—for example, foraging for berries or swimming in the ocean. When children see wild berries, their kinaesthetic and sensorial response is to pick and eat the fruit, or when they see the ocean, they associate it with swimming (Kahn and Weiss, 2017). Interaction patterns can be considered a dictionary of sorts. Once an activity or association is sufficiently built up, it remains instilled in our bodies until we need to use it again.

Interaction patterns, such as digging in the earth, also result in increased environmental moral affiliation (Kahn & Weiss, 2017; Wake & Birdsall, 2016). Kahn and Weiss suggest building moral affiliation towards any form of nature is

the end goal of repeatedly performing interaction patterns. Other acts that address EGA are planting in a garden, falling (safely) with something in your hand, watching a sunset, and even hugging a tree. All these interactions remind children (and others) that nature *is* everywhere and can increase moral affiliation towards it.

Gardening is consistently identified as a strategy to remediate EGA (Kahn & Weiss, 2017; Grafton, 2020; Wake & Birdsall, 2016). Wake and Birdsall (2016) argue that the processes involved in planning, building, planting, and maintaining school gardens increases moral affiliations towards the environment. Similarly, Grafton (2020) explores how sensory activities such as gardening create food chain awareness and establish eco-consciousness in children--reminding them of their role within the natural assemblage. Ultimately, school gardens help situate people by creating opportunities for interaction with other species and ecological systems (Bendt et al., 2013; Kahn, 2022). Research therefore suggests that nature experiences and building interaction patterns provide important experiences for remediating EGA. We now turn to an analysis of participants' perceptions of school gardens.

Remediating EGA in school gardens

This part of the paper categorises the research findings into three themes. The first theme explores the benefits of learning in the school garden and how it builds skills

that can remediate EGA. The evidence presented explores how the first two symptoms of EGA, poor motor skills and moral affiliation, can be remediated in the garden. The second theme explores gardens as learning spaces connecting children to place through embodied weather experiences and farm-to-plate knowledge, therefore addressing the second two symptoms of EGA. Finally, the third theme provides examples of previously existing interaction patterns at TNSS that hold the capacity to remediate EGA.

1) Gardens build motor skills and moral affiliation

Learning in the garden provides many opportunities to engage in movement that contributes to both cognitive and physical development (Wainwright et al., 2020). Gardening is filled with activities inclusive of digging, foraging, planting, raking, weeding, etc., all of which build gross and fine motor skills. Fine motor skills are, first and foremost, a precursor for any child to write efficiently (M. R. Baker et al., 2015); they are, therefore, essential to develop for future learning. As some participants were conscious of the children lacking confidence in their physical abilities, motor skills are an important skill to develop. For some teachers, the gardens at TNSS were recognised for their ability to develop and hone these fine motor skills and enhance learning:

There is raking, digging, turning, and stalling. Yes, it's all pre-reading and pre-writing [motor] skills that they're building out there in the garden. They then bring these skills in here and write, read, or talk about it – Teacher 1

[Gardening builds] gross motor and fine motor skills [...] But I do think that, yes, it's very important that we're connecting with our environment– Teacher 2

While Kahn and Weiss (2017) explore the importance of building motor skills, we extend their ideas by offering new perspectives on how to hone fine motor skills from an early age. Gardens offer children the opportunity to engage in nature-based tasks that challenge their bodies to learn new forms of movement (M. R. Baker et al., 2015; Wainwright et al., 2020). The participants' reflections highlight that teachers can witness children's physical development in the garden, and the flow on effects it has into classroom learning.

Earlier, we highlighted participants' awareness of children's lack of environmental moral affiliation. However, before developing this moral relationship, they must have a baseline of emotional well-being (Kahn, 2022). Cultivating a sense of well-being is a precursor to building moral affiliation and

respect for the environment, as it provides positive foundational experiences to draw from. Regular opportunities to connect with nature can foster long-term health and well-being in children (Lovell et al., 2014), increase engagement and fulfilment from schooling experiences, and encourage better social relationships (Maller, 2004; Scannell & Gifford, n.d.). This is especially important for disempowered or at-risk youth who struggle to engage at school and, as the school counsellor and youth support worker proposed, do not necessarily hold moral consideration for anything within the school grounds. If interactions with nature are consistently harmful or destructive, it can be hard to reflect positively on their experiences. Thus, children must find a sense of well-being before attempting to remediate symptoms of EGA. The following examples provide insight into participants' views on gardens fostering well-being:

> *I think it's great for their mental health and their physical health –*
> *Teacher 7*

> *But there's also so many links with mental health and being outdoors*
> *in nature. I just think children really need to get off the screens, or*
> *what do they say? Less screen time, more green time? —Teacher 2*

It's nice to see kids who feel like they can't be good at very much

having that success [in the ability to grow plants] – School

Counsellor

[Gardens are] really good for teaching [the at-risk youth] social

skills, increasing pride, giving them something that they can chill out

with – Youth Support Worker

The gardens at TNSS appear to be engendering environmental moral affiliation in two different yet potent ways. The first, where gardens are integrated into the entire curriculum, demonstrates how children develop a strong emotional bond to the plants they are responsible for, like that of a cat or dog. The second, where the at-risk youth were given the autonomy to build and raise their own gardens, demonstrates how children can develop a sense of agency in being environmental stewards. Using gardens in these two capacities has been transformational in creating moral consideration, exhibited by the children being emotionally affected by what happens to their gardens and, similarly, being eager to communicate to their peers the benefits of gardening and composting. They exhibit moral affiliation because they are aware the environment deserves respect – like any human would (Kahn, 2022). The children are learning to think about their interactions with plants and act in their combined best interests. As in the work of

Wake and Birdsall (2016), if children are involved in building and learning in the garden, they will find a sense of pride and increased affiliation with it – they will respect the health of the plants they are responsible for raising. The following are small snapshots of how gardens contribute to de-escalating this symptom of EGA:

The children were mortified that year when the vandals came in [and smashed their watermelons], they just couldn't understand it. 'Why would they do it?' You know, 'this is our garden [...] and why did they come and do this?' They took it very personally – Teacher 1

Some of the really naughty kids get into it [gardening] and they're like, you know, planting those seeds and watering it. They want to be out there – Parent 1

*Take ****, for example, they want to get up and talk about composting now in the whole school parade, he loves it. He wouldn't have done that if it wasn't for being involved and doing it – Youth Support Worker*

These considerations suggest that participants recognise the role that gardening experiences offer children in developing embodied emotional

connections. In other words, the gardens are shaping school experiences and enhancing environmental moral affiliation. It is important to contextualise that TNSS is in a neighbourhood with diverse socio-economic demographics. Reflecting this, the school has established many avenues to support and empower disempowered local youth; the gardens being just one. The Youth Support Worker claims disempowered youth exert agency through building raised garden beds and being the sole caretakers, caring for life forms beyond themselves. Some disempowered youths are eager to understand their garden and compost system enough to make it thrive, and then share their knowledge with their peers. Their newly found pride and respect highlights the significance of alternative learning opportunities for well-being and improving human-nature relationships. It also engages children in their place (Scannell & Gifford, n.d.), as discussed below. Similarly, the children's devastation by the intentional destruction of their garden suggests children are particularly well-disposed to learning valuable lessons by building interspecies relationships (such as the fragility of life – exhibited by the destroyed watermelon) (see also Malone 2016). The take-home messages this leaves us with are: 1) gardens set children up to have increased physical resiliency by building body awareness; and 2) gardens extend children's moral affiliations past human-human relationships and into the more-than-human realm, solidifying their role in the natural assemblage and directly challenging the manifestation of EGA.

2) Growing place connection through embodied experiences

The Australian Curriculum, including the adjacent sustainability cross-curriculum priorities, are national policy documents that can be delivered in place-specific ways (Walshe et al., 2022). So, whilst weather-related content first refers to the standard Euro-centric calendar of Summer – Autumn – Winter – Spring, it is and should be adaptable to local contexts. Depending on the place, these Euro-centric seasons can be a disorienting concept to learn. As highlighted in the literature review above, participants were aware of children's intellectual disconnection from their local climatic conditions. However, teachers also see learning in the garden as an opportunity to engage children in place. While the teachers at TNSS teach local seasons to the children, learning in the garden helps communicate this difference more effectively, as the children are experiencing how the tropical climatic conditions affect their bodies and their surrounding environment. The ability to physically understand how intertwined we are with the weather is recognised as an important practice in effective weather-related education (Ødegaard & Marandon, 2019). It also engenders someone in their place (Scannell & Gifford, n.d.). By increasing place attachment through embodied weather-related activities, teachers

can effectively aid in de-escalating EGA. Teachers recognised the interrelationship of embodied weather-work and gardening experiences:

> *It makes it more real and purposeful [...] like if they're outdoors, then they're learning about things outdoors. The seasons fit with that. They're learning about gardening - the seasons fit with that. They must learn seasons to be able to engage with the outdoors – Teacher 2*

> *And now we're getting to this really tumultuous type of weather [wet season]. So, it really shows, we take the temperature of the room, we take the temperature outside [at their garden] and see how it affects them [the kids] and plants, and other animals as well, like the birds! The birds are starting to nest too – Teacher 7*

This illustrates that teachers are aware that children can build their place connection by regularly working with the garden, as they understand how their local weather affects growth cycles and life, which may differ from those in other regions and books. This speaks to Law's (2019) findings that gardens build knowledge of the local environment, and that (both ourselves, and) the produce grown in the garden is a physical embodiment of the weather (Ingold, 2010). Our

data also joins an extensive list of scholars highlighting how school gardens enhance farm-to-plate food system knowledge.

Food is an inherent part of nature and growing up in urban environments shields children from the processes involved in cultivating their food (Grafton, 2020; Uhlmann et al., 2018). Historically, food was a place-bound concept: we ate seasonally and locally, foraged, hunted, or gathered. Now we go to shopping centres or supermarket chains and have access to food that neither grows seasonally (e.g., cabbage being available all year), or locally (e.g., mangoes in temperate climates). Understanding that food is mostly or initially natural and not originating in a supermarket, is a crucial factor to building urban food system resilience (Anderson, 2015), and bridges the (generational and physical) gap between farmer and urbanite. Below are examples highlighting how teachers and parents considered garden interactions to instil life-long skills and a sense of how weather affects food growing processes. One teacher alluded that gardening brings children into contact with their local non-human counterparts:

> *If they were growing food themselves, they would have a lot more*
> *connection to it, and maybe less waste. They would get an*
> *appreciation for how long something takes to grow – Teacher 3*

I mean they may not know spring or autumn or something like that. But they know hey it's getting hotter, and our vegetables are going to die if we don't put something up! – Religious education instructor (REI)

So that's where the benefits are [in gardening]. You teach a lot of important stuff, like life skills… and growing our own food is one of them [the benefits] – Parent 1

Yeah, it's real. It's natural. You pick it, and eat it, and talk about it. And talk about the life of the bugs in there, too. We've bought food in that has caterpillars on it! – Teacher 1

I think gardening also just creates an awareness of being more environmentally conscious and of how things grow and stuff […] – Teacher 4

These reflections highlight that teachers and parents recognise the value of gardening in improving food relationships by distinguishing their locality and seasonality. Understanding how weather influences food is vital for encouraging food sovereignty in urban areas as it prepares urbanites to understand potential

climatic impacts on the agri-food sector (Larder et al., 2014). Understanding the embeddedness of food can improve pro-environmental behaviours, (Larder et al., 2014; Reis & Ferreira, 2015) and result in children treating their environment with more agency and respect--feeding back into building moral affiliation to combat EGA. Furthermore, Teacher 1, recalling that their food had caterpillars when they brought it in from the garden, speaks to debates that consider our place within the natural assemblage. Teachers explained how the children watched the caterpillars eat the leaves of their produce, demonstrating that food is just as much needed by our non-human counterparts as it is by us (E. Sarmiento, 2017). This could have informed discussions on how food-nature-human relationships are deeply connected. Extending these themes of embodied weather and food knowledge we now provide examples of interaction patterns in the garden. These instances also offer us some insight into how pedagogical approaches matter in regard to food education (Walter, 2013).

3) Building interaction patterns in the garden

Interaction patterns are defined as tasks or activities that enhance a child's ability to critically understand and describe how they themselves, and all things in their life, are part of and engage with nature (Kahn & Weiss, 2017). Although EGA informs researchers focusing on gardens in schools, there is little understanding of how

EGA can be combatted by embodied food (growing) and place-based weather interactions. As a learning space that readily involves child-led pedagogical approaches and is both experientially driven (Fisher-Maltese, 2016) and place-responsive (Lynch & Mannion, 2021), gardens offer the opportunity to experiment with different pedagogical approaches in school. Gardens reinforce the relationship between food in the ground and food from shops. Gardening embeds an understanding of place, as the seasons and local environment dictates what will/will not grow. Embedding gardening as a regular activity into the school experience ensures that children have tangible experiences to draw upon later in adulthood.

Gardens situate us by connecting us to the local seasons and environment. They challenge us to consider how nature works (Law, 2019). Tending to the garden throughout various seasons, and completing tasks such as digging, weeding, planting, and harvesting, situates people in place (van Holstein, 2016) by involving them in the environmental processes around them. Our research illuminated how interaction patterns are developed in the garden, highlighting gardening experiences that increase seasonal awareness through food availability, and how processing food from ground to plate can close the gap between farmer and urbanite:

> *you start to know like [...] Christmas time is lychee season*
> *[...], or that Mango trees are in flower – Parent 2*

[knowing the seasons] plays a part in what you're going to plant, you want drought hardy plants that are tropical you know, for dry season – Parent 2

[Because of gardening] we know grows at what time of year – Youth Support Worker

Just the joy, you know, the kids squeal with delight. And so, in the garden out here [points to the garden outside the classroom], we have potatoes. Which is cool! And so, we do the entire process. That's the lesson. We grow them [the potatoes]. We dig them. We clean them, we cut them up, we make them into chips, and then we eat them – Teacher 1

Building the skills, knowledge, and means to grow food challenges the disconnected food practices symptomatic of EGA. Our participants highlight that growing food is a skill children can carry into adulthood; this is a fundamental goal of positive interaction patterns (Kahn & Weiss, 2017). To summarise, our informants emphasised that by engaging with processes in the gardens children come to understand what fruit or vegetables will be available depending on the time of year. Gardening thus increases awareness of the seasonal calendar and how it

affects our diets. Our research informants also called attention to interaction patterns that enhance food connection by engaging students in the complete process of planting, growing, harvesting, cooking, and eating. They highlighted that through gardening, children can build the association between what grows in the ground and what they eat. Figure 5.4 is a drawing from one student at TNSS who regularly engages with their school garden. It was drawn in response to a group activity where students were asked to draw 'food' and expresses the link between food and growing plants, including potatoes which are grown annually in their class garden.

Figure 5.4: Children's drawing of food growing context

This drawing reflects the food–nature interaction patterns that gardening creates. It highlights that gardening develops an associating between the potatoes children eat as food to the potatoes grown in the ground. Teachers also commented on how these outdoor experiences allowed children to recognise and anticipate seasonal change by the bird species present in the garden (such as the Torresian imperial pigeon or Masked lapwing plovers). This insight suggests that garden interactions are enhancing children's awareness of their surroundings. Food and weather-related interaction patterns in the garden further invite us to consider how

school gardens can physically challenge children to see nature happening within their urban fold; opposing the notion that it needs to be big, pristine, or out there (Kahn, 2002).

Conclusion

EGA manifests in the children at TNSS, and this paper provides evidence that reflects the symptoms of EGA highlighted by other researchers including Kahn (2002, 2022), Kahn and Weiss (2017), Uhlmann et al. (2018), and Grafton (2020). Teachers, parents, counsellors, groundskeepers, and administrators at TNSS all noted evidence of poor motor skills, limited or poor environmental moral affiliation, and both disconnected food origin and place awareness. Their perceptions attest to the manifestation of EGA and contribute to wider discussions of how EGA presents itself in urban, school-aged children. Throughout the literature review we analysed instances perceived by our interview participants and offered a place-based analysis of how EGA manifests. EGA can manifest for different reasons, and these often depend on the particularities of place (in this research, being in the tropics is important). Moreover, although EGA is written about mostly in relation to children in densely urban areas with limited natural spaces, symptoms can manifest in locales where the natural environment is still present and thriving. Our discussion explores how EGA ca be remediated through

gardening by providing insight into how TNSS gardens provide learning spaces that are increasing children's motor skills and enhancing environmental ethics. We further explored connections to place and delved deeper into how gardening, and using gardens as learning spaces, connects children to their local place and food systems by facilitating interaction patterns that ultimately increase awareness. A summary of these findings is depicted in Figure 5.5. We extend previous research by presenting what our interviewees perceived to be instances of interaction patterns that contribute to the development of essential motor skills, seasonal embodiment, food origin connection and enhanced environmental moral affiliation.
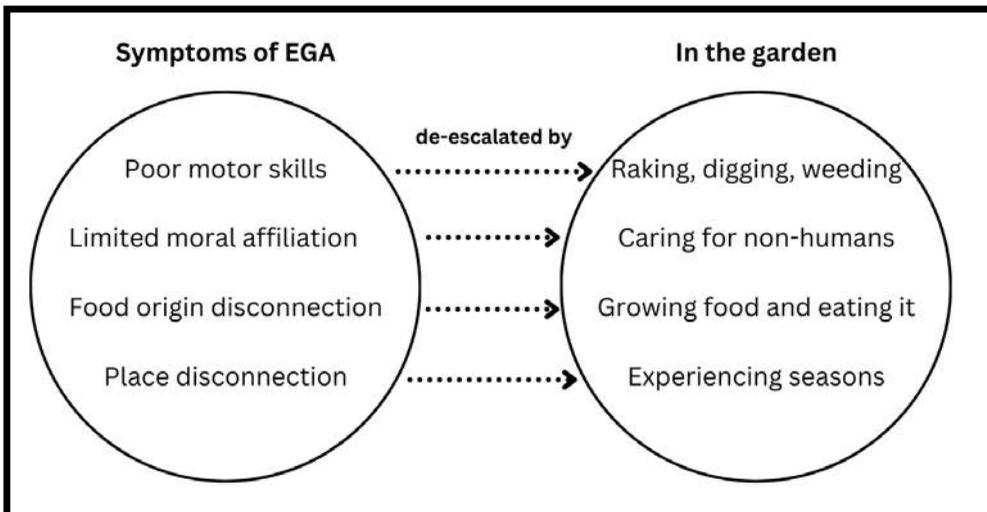
Figure 5.5: Summary of activities performed or experienced in the garden that can de-escalate symptoms of EGA

Students at TNSS are fortunate as this school provides many opportunities for gardening on the school campus, from in-class activities and gardens as learning spaces to social groups and alternative learning programs. The role gardens play at this school is ever increasing, for reasons which reflect the benefits of gardening found within this paper. Because of gardens' practicality as learning spaces (Walshe et al., 2022), TNSS has easily incorporated them into students' learning journeys while still adhering to the Australian curriculum. This puts TNSS on the forefront of addressing EGA as gardens in schools provide unique opportunities to build interaction patterns in the urban environment, capable of remediating symptoms of EGA. As our cities become larger and higher, there will be many instances of children having fewer opportunities to create their own meaningful nature-based experiences. School gardens can thus provide safe havens for children to understand their role in the natural assemblage which, in the long run, can contribute to remediating EGA.

5.2: Chapter summary

Even though Gimuy is a relatively lush, regional city in a tropical environment, EGA is still perceived to exist in children. This aligns with Kahn's (2002) findings that children in urban environments across all cultures and regions tend to have similar organisational structure, affection towards, and experience of nature. As in, they are facing similar issues of disconnection. While this research aligns with sentiments from Kahn (2002, 2022), it also extends upon them by considering food origin disconnection as a manifestation of EGA.

The research in this chapter has unpacked the potential correlations that exist between currently understood manifestations and food disconnection and provided examples as to why. Themes from the interviews suggested that yes, manifestations of EGA are present in the TNSS student population. Evident in the witnessing of instances where children displayed low levels of motor skills, poor moral affiliation towards the non-human realm, limited food origin awareness, and were evidently disconnected from place. However, the themes explored in this chapter also highlight that school-based community gardens are effective avenues for de-escalating EGA. First, by improving motor skills (both fine and gross) through repetitive movements referred to as interaction patterns. Second, by engaging with non-human counterparts which enhanced moral affiliation towards the natural realm. And third, by contributing to an increasing awareness of food

origins by bridging the gap between local ecologies involved in food production and daily interactions. Lastly, the experience of gardening serves as a means to de-escalate EGA by providing children with an embodied, sensorial understanding of their local environment, thereby reconnecting them to essential processes such as weather, local migration patterns, and the interdependence of other animals on food sources.

While I have presented evidence as to why food origin disconnection could be considered a manifestation of EGA, it is important to hear from the children themselves. In planning this thesis, I knew it would be vital to engage with the children of TNSS to gain their *own* insight into their food connection. Without it, the perspectives of teachers, parents, and the rest of the school community I interviewed are simply that – just perspectives. Thus, in the following chapter (Chapter 6) I will investigate what children think of when they hear or think of the word food, and fully unpack whether children consider food to be of natural origins (or not).

Chapter 6.0: Phase 3

There is a general consensus among the global community that children in urban environments tend to not know where there food comes from (Cairns & Johnston, 2018; Kos & Jerman, 2012). In 2007 Jamie Oliver first brought the problem to the global stage when he went into British primary schools and children did not know what a tomato was (Curtis, 2007). The world was shocked. In the previous chapter, (Chapter 5), this food origin disconnection was link to EGA. In the current chapter (Chapter 6), the focus shifts to investigating children's own perceptions of food. Specifically, I explore whether regular engagement with food gardening at school enhances a child's understanding of the origins of food. While I do not explicitly talk about EGA in this chapter, there are themes that begin to emerge that are deeply relevant to the phenomenon. For example, place connection, food origin awareness, and globalised, placeless food systems make up a large part of the discussion. Thus, this chapter addresses Research Question 4: How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning? (see Figure 6.1).

The aim of this chapter is to understand whether children who garden and learn under experiential/place-responsive pedagogies have more awareness of where their food comes from. To investigate this, I compare drawings from the two

pedagogical streams at TNSS, the standard (explicit instruction) and the Montessori

(experiential/place-responsive). I chose drawing as a means of data collection as it

ethically responds to the needs of the participants (Anning & Ring, 2004), which in

this instance are children under 8, who might find interviews difficult to complete.

The children were asked to draw what came to mind when I said the word food and

were then compared to understand whether regular garden interactions have an

impact on food system awareness and place connection. The ensuing analysis offers

valuable insights into the impact of gardening on children's perceptions of place

and food. Rather than opposing the omnipresent globalised food system, it reveals a

complementary relationship. Those who engage in gardening exhibit markedly

heightened awareness of their local environments and foods.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

School-based community gardens battling food disconnection as a manifestation of Environmental Generational Amnesia

Chapter 1

Introduction

Chapter 2

School Gardens: A review on the benefits and barriers

Chapter 3

Mapping the Australian Curriculum

Chapter 4

Doing research with teachers as busy people

Chapter 5

Understanding Environmental Generational Amnesia in school gardens

Chapter 6

Pedagogy, place, and food education

Conclusion

Environmental Amnesia as food origin disconnection can be de-escalated through experiential/place-responsive learning

Figure 6.1: An overview of the thesis structure highlighting what Research Question (in this case RQ4) the chapter is responding to

The following is an adapted version of a manuscript submitted under: Walshe, R., Law. L & Evans, N. S. (Snowy). (2023). Pedagogy, place, and food education in Australian schools: Lessons from Tropical North Queensland. *Children's Geographies*. (In review)

6.1: Pedagogy, place, and food education in Australian schools: Lessons from Tropical North Queensland

Children today have limited food origin awareness. The further we move away from food production practices, the less exposure children have to them, and the more food vulnerable we become. This is especially true for children growing up in urban areas where there is limited space for food gardens. Schools have developed targeted pedagogical approaches to raise food origin awareness, and this paper examines one such attempt in Cairns, Far North Queensland, Australia. We compare how students aged five to six responded to an activity where they drew their immediate response to the word 'food.' Comparisons were then made between those learning under explicit instruction and those using a more experiential, place-based pedagogical approach. The findings suggest students in the experiential class who regularly use the garden as a learning space drew significantly higher levels of fresh, place-appropriate fruits and vegetables (U= 61.5, P= 0.002). In other words, children know what they grow. We discuss the ramifications of exposure to a globalised food system and how experiences at school can nurture children's understanding of food. We interpret the outcomes of the different

pedagogical approaches and unravel the importance of 'place' in a child's food experience. The evidence presented suggests that children's food knowledge could improve if food education is bolstered with experiential and place-responsive pedagogies in school gardens.

Introduction

Food is an essential, sensorially experienced component of life that ties us firmly to the present and the past, situating us in place (Bhattacharya, 2021). However, our relationship with food has become fragmented. Our food chain is globalised, and although food used to directly connect us to place, many of the foods we consume today contribute to a placeless society (Delind, 2006). The process of globalisation, while creating connected economies, has ruptured our relationships with the environment, homogenised our way of living (Banks & Overton, 2010; Gibson-Graham et al., 2016), and seriously altered our relationship to food. While many urbanites were once well versed in the seasons, local environment, and where their food came from, there is a growing consensus that children (and many adults) are now so removed from natural experiences that they lack the knowledge that comes with them (Artmann et al., 2021; Kahn, 2002; Uhlmann et al., 2018). As such, we have become overly dependent on the monetised economy that food is embedded in (Ruel et al., 2017). Being entirely dependent on the economy to procure food, as we are in urban areas, means many are vulnerable to becoming food insecure due to unexpected events such as sudden inflation, global pandemics, or natural disasters (Reis & Ferreira, 2015; Ruel et al., 2017). One way to address the growing problem of food vulnerability is to reconnect people and place ecologies, thus reducing their dependence on the monetised food-economy.

Food vulnerability is a wicked problem that requires multidirectional problem solving. Wicked problems are not easily solved due to their large array of complex causalities (Svane et al., 2019). Food vulnerability is considered a wicked problem as it is influenced by a wide range of interconnected factors, including socio-economic status, ethnicity, access to resources, climate change, agricultural practices, political (in)stability, and more (Hamann et al., 2011). Most metropolitan urban areas in post-industrial, Western capitalist societies suffer food vulnerability—with much good quality agricultural land making way for suburban development (Food and Agriculture Organisation, 2020). How can cities respond to disasters without the means (space) and knowledge to procure their own food? One of the many ways to overcome this wicked problem is by using education as a catalyst for change. By understanding where food comes from and how to grow it, the food vulnerability faced in urban areas can be ameliorated, as knowledge to procure and/or grow is a pre-requisite for food security. We propose, alongside other scholars (Carlsson et al., 2016; Datta, 2016), that urban gardening can equip children to deal with food vulnerability, by connecting them to the origin of food.

How do we effectively implement urban gardening to assist children in dealing with food vulnerability? While scholars have investigated the role of school gardens in enhancing food availability (Reis & Ferreira, 2015), the important role that pedagogy plays in delivering this knowledge is less understood. Pedagogy is

the art and science of teaching, and encompasses the methods, strategies, and principles that educators use to facilitate student learning (O'Neill et al., 2013). Currently, Australian schools follow the Australian Curriculum to develop learning programs for students from Prep through to Year 12. In the P-6 curriculum there are various subject codes and content descriptions that focus on food. But the national curriculum body, the Australian Curriculum and Assessment Reporting Authority, do not provide instructions on the pedagogical approaches that ought to be used. Such approaches are up to state body discretion. So, while the Australian Curriculum is a nationally designed, place-adaptable policy document that is meant to respond to current societal needs (Walshe et al., 2022), incorporating issues such as food vulnerability in ways that are locally relevant and easy for children to understand can prove difficult. The structure of schools, standardised testing, teacher shortages, and data driven approaches to learning constrain the pedagogical approaches teachers use to adapt and deliver the curriculum (Billmayer, 2019; Liddicoat et al., 2018).

There are many different pedagogical approaches that teachers, and schools, can choose to draw from. In Australian schools, a prominent approach is explicit instruction, which focuses on the transference of knowledge from teacher to student, in a staged and structured approach, limiting the mental effort students need to learn new content by using a scaffolded "I do, we do, you do" approach

(Australian Institute for Teaching and School Leadership, 2023). Whilst explicit instruction is a research-based pedagogical approach (O'Neill et al., 2013), some scholars argue for more place-responsive pedagogies which respond to experiences in the local context in a way that is less effort for the teacher to adapt. Place-responsive pedagogies are developed to produce educational experiences for children to equip them with the knowledge to discuss and understand climate adaptability, sustainability, and global issues (Renshaw & Tooth, 2017; Somerville, 2010), by collaborating with an 'assemblage of people, place, and purposeful activities' (Mannion et al., 2013, p. 793). As such, they are predominantly drawn on in outdoor and environmental education where the environmental already plays a pivotal role. Place-responsive pedagogies are an extension of inquiry-based and experiential pedagogies, which rely on a process of asking, doing, and then knowing (Amels et al., 2019; Marshall, 2017). Experiential pedagogies were born from educational philosopher Dewey, who argued learning should be pragmatic and based on doing first to then build knowledge (Dewey, 1974; 1986). These approaches are generally seen in schools where alternative styles of learning are employed, such as Montessori (Montessori, 1912; Marshall, 2017), or as a means to engage disengaged children and those with diverse learning needs (Moore McBride et al., 2016).

This paper is a case study investigating the outcomes of explicit instruction and experiential/ place-responsive pedagogical approaches to teach food education in primary school. The school setting examined here is in Gimuy (Cairns), located in the tropical zone of Australia. The aim is to understand the effectiveness of each pedagogical approach for enhancing children's food awareness and learning to overcome the deficiencies of the globalised food system. However, gathering relevant data to explore children's knowledge is challenging. We join scholars using children's drawings as important evidence in classrooms (Anning & Ring, 2004) to contribute to debates about the importance of place-responsive pedagogies and gardening in enhancing children's food knowledge. We appraise whether children who learn under experiential/ place-responsive pedagogies, with substantial garden contact time, have an increased awareness of food origins in comparison to those who learn under explicit instruction with little garden contact time. By doing so, this paper contributes valuable insights to the conversation surrounding food education in schools and is one of the first to compare and critique the outcome of two pedagogical approaches in the same school regarding food education and food awareness.

To situate the research, the next section presents a framework that underscores the interplay of place, food, and school gardens in enriching children's food knowledge. We acknowledge that research with children can present

challenges and potential imbalances in researcher-child power dynamics (Bland, 2018), and our methods section elaborates the merits of employing free drawing as an ethical method for collecting data from young children. Our discussion sections go on to interpret the drawings obtained in our study. We explore how different pedagogical approaches shape children's engagement with tasks and evaluate how each approach enhances food awareness. We present evidence suggesting that experiential/place responsive pedagogies result in enhanced place awareness. In the final section, we examine the influence of media exposure and the globalised food system on children's perceptions, enthusiasm, and conceptualisation of food. We conclude by presenting the broader implications of our findings for food education in Australia and consider the potential applicability of our insights in diverse national and global contexts.

Food, place and enhancing children's food knowledge

We begin by exploring how food, place, and gardening are important concepts to frame the research. Food situates us in our local context, connects us to culture, and eating or cooking is a sensorially encompassing experience that embeds itself in our visceral memories (Bhattacharya, 2021; Law, 2001, 2005; Wesser, 2021). When lonely, simply by eating foods reminiscent of lost times, we can find a sense of comfort or ease (Bhattacharya, 2021; Law, 2001). Food also helps us integrate into

new environments and cultures while maintaining a connection to our origins (Chen, 2021). Food can be our familiar in the unknown.

Food is also a material manifestation of place, with physical and cultural landscapes simultaneously contributing to the way food tastes; Dijon mustard, King Island cheese, Valencia oranges, and Italian tomatoes all connote this relationship. Banks and Overton (2010) stress this significance of place identity in their analysis of wine, exploring how the wine industry has successfully reinvigorated an understanding of place through celebrating the ecologies and bottling processes in each region. The importance of understanding this sense of place, or 'terroir,' is translatable to the world of food—especially for place branding scholars who explore this link between food and place explicitly (e.g., Khamis, 2007). If the geographic context of food, and the practices and traditions involved in its production and consumption were more widely appreciated, children might have deeper place connections through food experiences.

Participating in local food systems can also help people gain a sense of place through food experiences. People re-connect to place by visiting locally owned grocery stores, engaging in communal gardening practices, and participating in food co-ops (Delind, 2006). By actively participating in these alternative social, economic, and ecological spheres, everyday citizens can reinvigorate their sense of

place (connection), enhance the visibility of their local food system, and bring about food resilience. But how do these concepts relate to increasing children's awareness of food and place through gardening in schools?

School gardens, part of the community-based food system, can deepen a child's understanding of food. They provide access to fresh fruits and vegetables (addressing one aspect of food vulnerability [Carlsson et al., 2016]), and improve a willingness to try new foods (Nowak et al., 2012; Somerset et al., 2005). Gardens are also a place of trial and error (Artmann et al., 2021; Cutter-Mackenzie, n.d.; P. G. Payne, 2020; Uhlmann et al., 2018), and gardening thus instils in children (and teachers) how difficult it can be to grow food. School gardens stand in contrast to unhealthy and processed foods, which children are highly susceptible to (Cooke, 2007; Gorn & Goldberg, 1982; Hastings et al., 2003). Gardening at school exposes children to where their food comes from and acts a grounding reminder that food is not just processed and quick--it takes time, love, and dedication.

Gardening in schools teaches children about cultural landscapes and people's role in local ecologies. It can help integrate migrant children into their new 'place' while allowing them to foster connections to their cultural roots (Cushing et al., 2017; Hardy & Grootenboer, 2013); it can also help children contribute to changing cultural landscapes by engaging with and repopulating native foods that

are important to Indigenous cultures (Walter, 2013). Embracing the holistic thinking and being that comes with gardening exposes children to the needs of our more-than-human counterparts (bugs, plants, animals), and how they rely on food in the same way we do (E. R. Sarmiento, 2017; Turner, 2011). Garden design and choice of plants itself is a responsive embodiment of physical place (Law, 2019). For these reasons, gardens are ideal spaces for teaching children about place, culture, and our role in local ecologies.

So far, we have suggested that considering the geographic context of food, along with the traditions and practices involved in its production, can deepen connections to specific places through food experiences. We have also indicated the significance of school gardens as educational tools that can enhance children's understanding of food, culture, and local ecologies. School gardens are spaces where children can access fresh produce, learn about the effort required to grow food, and gain a deeper awareness of where their food comes from. But how place responsive pedagogies enhance a child's understanding of food is still relatively under-explored. The next section presents the research context and the methodology used to capture the data, before going on to examine these issues at a particular school.

Methodology

Tropical North State School (TNSS) (pseudonym name) is a government funded primary school in Australia's Far North wet tropics, and the setting for the research. Demographically speaking TNSS is one of the largest schools in Gimuy (Cairns) with just under 1000 students from Preparatory to Year 6 in attendance. One third of the people who live in the school's catchment area have relocated to Gimuy within the last two years (since the 2021 census). Most relocations are from interstate or overseas, with very few coming from Queensland or other tropical areas. This means many residents' everyday sense of place has been shaped by different environmental experiences.

TNSS offers two educational streams using different pedagogical approaches: explicit instruction and the Montessori method (which we subsequently refer to as the experiential stream). Parents and caregivers have the option to select either of the alternative learning streams that best suit their child's educational needs. If a Montessori method class has available space, the school extends the opportunity for parents/caregivers to transition their child into this stream, based on their identified learning requirements. Explicit instruction is focused on the transference of knowledge from teacher to student, and follows a scaffolded "I do, we do, you do" approach (Australian Institute for Teaching and School Leadership,

2023). The Montessori method, on the other hand, uses experiential/ place-responsive pedagogical approaches. The method focuses on children learning in dynamic social and emotional learning environments that use hands-on and sensory activities to engage children in developmental learning (Montessori, 1912; Marshall, 2017). The educators draw on activities that use gardens, kitchens, live animals, and various social settings to enhance children's knowledge via hands-on methods. These alternative styles of education are equally academically effective with school leavers achieving identical 'test' scores to other children learning under explicit instruction (Marshall, 2017).

The experiential stream using the Montessori method at TNSS spends one full day each week where all curricula is delivered using their garden and outdoor environment as their learning space (Montessori, 1912). In addition, students participate in growing various seasonal or local products such as dragon fruits, watermelons, strawberries, different types of potatoes, and pineapples. TNSS is one of five government funded schools in Australia that have separate streams for the differing pedagogical approaches (Montessori Australia, 2022). This positions TNSS as a unique place and opportunity to investigate the benefits of each pedagogical approach.

Three different classes at TNSS participated in the research. The first is a Prep and Year 1 composite class using experiential and place responsive pedagogies (n=17). Two additional classes learning under explicit instruction were included: a Prep class and a Year 1 class (combined n=38). The latter two classes accounted for the composite class in the experiential stream and helped provide representativeness of both pedagogies. Once teachers from the experiential and explicit streams in Prep and Year 1 agreed to participate, parent consent was sought. All children were aged 5-6 years old.

Three drawing sessions were conducted by the lead researcher/author, one for each of the three classes participating in the research (in total 3 x 45 minutes). The setup process included explaining the activity, consent, and addressing any queries. The students were given the opportunity to consent/dissent for themselves by using 'red light, green light' place cards for dissent/consent during drawing sessions. This was an ethical consideration to respect the children's autonomy in making their own decisions (Deguara, 2019). Children used crayons and blank paper that were supplied by the researcher to respond to the question, 'What comes to mind when you hear "food"?'. A follow up conversation was conducted with each child to confirm and annotate what they drew, as per Loureiro et al. (2019). This minimised interpretation bias and accounted for age and cultural differences between children and the researcher (Bland, 2012). In total, there were 22 pages

from the 17 experientially taught students, with a total of 99 individual food items drawn; and 46 pages from the 38 explicitly taught students, with a total of 95 individual food items drawn.

The visual analysis of the drawings acknowledged the different considerations required when analysing children's drawings. Some considerations included using follow up questions to enable accurate interpretation of their drawings, observations of their ability to stay engaged with the task notes on the values of the adults in their life (in this instance, their teachers) and notes on the physical environment during the task (Anning & Ring, 2004). Children under eight years of age draw from what they know and use imagination to bolster what they do not (Anning & Ring, 2004). This often results in drawings being wildly colourful, often abstract, and 'simple' (in terms of composition). Many standard image analysis techniques look at placement, colour, composition, and symbolism – which stylistically can discredit a child's work (Anning & Ring, 2004). Thus, this analysis is positioned from the viewpoint that children are autonomous with valid thoughts, emotions, and experiences to convey and the images are analysed accordingly.

Multiple different analysis techniques were used to do justice to the children's perspectives (Loureiro et al., 2019). First, drawings were deductively (or denotationally) analysed, following similar techniques and recommendations from

Boyatzis (1998). Branded, fresh, and processed foods were sought out and the drawings were denotationally categorised accordingly. This was followed by a round of inductive, or connotative, analysis to further explore common themes across the drawings. Denotation requires deductive thinking and seeks an object's literal meaning; connotation requires inductive thinking and explores the suggestive power or emotion images might evoke. Statistical analysis was also conducted using Excel and SPSS. Food occurrences were tallied and compared between experiential and explicit groups through Mann-Whitney U tests (due to the uneven population sizes), assessing differences in processed and natural foods drawn. Significance scores <0.05 were identified. This straightforward methodology provided sufficient rigour to analyse how gardens impact food perspectives.

The difference pedagogical approaches make to food awareness

In this section, we evaluate the impacts and effectiveness of different pedagogies in enhancing children's food awareness. As discussed above, two distinct pedagogical approaches are taken in classrooms at TNSS. For students in the experiential stream, gardening and harvesting are regular (weekly) activities that engage them in real-world learning. The garden is easily accessible, located just outside their classroom (see Figure 6.2). By engaging in seed-to-plate gardening, students in the experiential stream experience a comprehensive integration of food education into

various subjects, including English, Maths, Humanities and Social Sciences, Art, Health, and free play. In contrast, students in the explicit instruction stream engage with the natural environment differently. Their classrooms are not near a garden, and they do not participate in weekly gardening sessions like their experiential stream counterparts. Typically, they join gardening clubs or participate in the *Stephanie Alexander Kitchen Garden* program, but these programs mainly cater to the older students from Years 3 to 6.
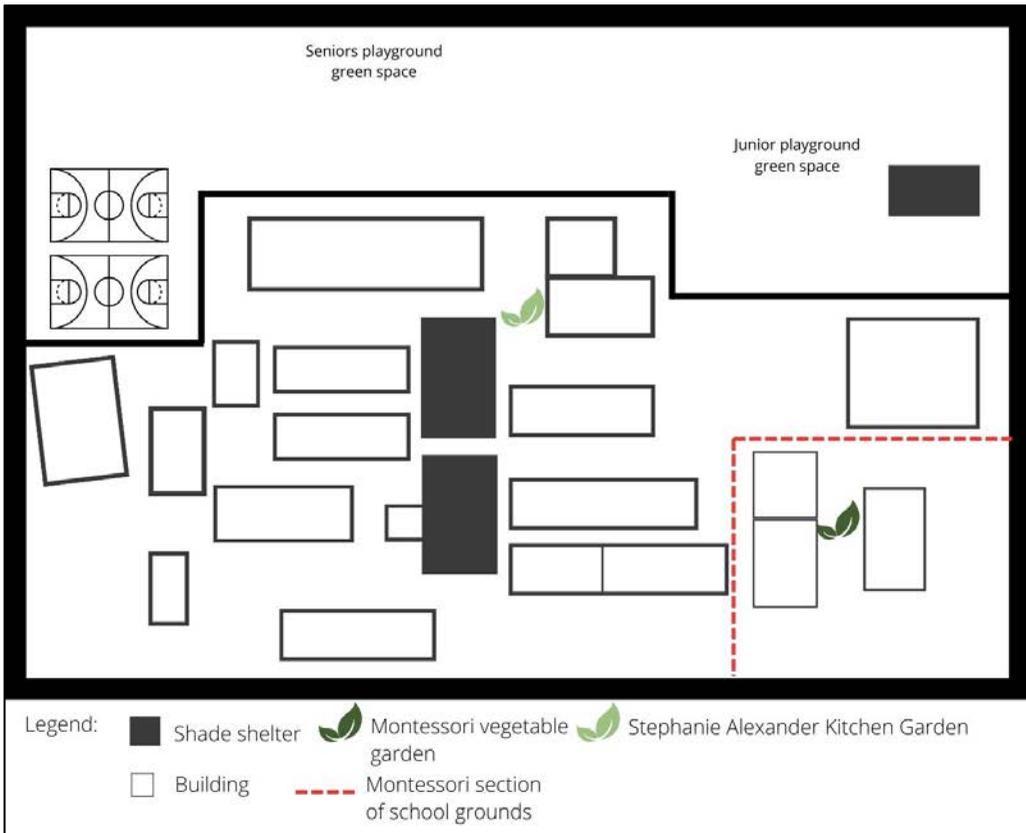
Figure 6.2: Overview of the TNSS campus

There were differences observed across the two streams in terms of children's behaviour and engagement when conducting the drawing activity. Students in the experiential stream took the entire 15 minutes to complete their drawings, whereas students in the explicit instruction classes rushed to complete the task, often drawing only one singular food item per A4 sheet of paper (Figure 6.3). This significantly reduced the number of food items drawn (on average) in the explicit instruction stream. The difference in their engagement aligns with findings from other scholars investigating pedagogical approaches (Marshall, 2017; Moore McBride et al., 2016), and suggests experiential learning empowers students to think and engage critically with tasks.

to

Figure 6.3: Singular food items provided by explicit instruction Prep and Y1 students

While both experiential and explicit instruction pedagogies play pivotal roles in shaping students' understanding of food, notable differences were observed across the streams, especially regarding the quantity and origin of fresh fruits and

vegetables depicted. On average, students in the experiential stream not only engaged with the activity in a more engaged fashion than those in the explicit instruction stream, but they also drew significantly more natural foods (U= 61.5, P= 0.002) (Table 6.1). This data reinforces the idea that students in the experiential stream, learning within an education model that promotes inquisitiveness (Sibatuara, 2022), approached the activity more thoughtfully. It also implies they are more acquainted with a greater range of fresh produce than their explicit instruction peers, suggesting the importance pedagogical approaches might play in delivering effective food education.

Table 6.1: Food types and average number of drawings per student

Stream	Processed food total	Natural food total	Average no. of items drawn per student
Experiential	19	87	4.24
Explicit	38	41	2.07894737

These differences in childrens awareness of natural food, and the impact gardening and experiential/place-responsive pedagogies may play in enhancing it,

is also evident in the background of the student drawings. Figure 6.4 showcases

one student's drawing of potatoes growing in their school garden. It reflects a

tangible connection with local ecologies – the sun, soil, and surrounding plants.

Although the methodology deployed here cannot discern if this child gardens

outside of school, the portrayal of potatoes directly echoes their school garden's

produce. Just prior to conducting the data collection for this study, the students

engaged in harvesting potatoes – which they do on an annual basis with this

teacher. The drawing also underscores the transformative potential of gardening in

cultivating an understanding that food is grown within local ecosystems, thereby

bridging the gap between children and the origins of their sustenance. This is

evident when compared to other nature scenes received from the explicitly taught

students, who do not engage in gardening, also in Figure 6.4. The bottom drawing

shows little awareness of the local tropical ecology and incorporates no food

growing elements. Instead, it depicts a temperate tree, possibly a fir or pine tree (it

could be a homage to the Christmas tree and is a standard tree type in childrens

cartoons).

Experiential student above: Garden growing chilies and potatoes. Apples, black and yellow bananas and a fish pond. Traffic lights, the sky and a piece of cereal
Explicit student below: A pine tree, a shrub, clouds, and two suns

Figure 6.4: Drawings from the experiential stream (top) and explicit stream (bottom)

While students in the explicit stream have engaged in growing potted plants (beans in this instance) in the classroom as part of the Science curriculum, this approach to teaching Science did not yield noticeable results in the data (no potted bean-plants). Nevertheless, it is worth acknowledging the importance of such practices in effective education. Since the 1900s, plants have been used to provide students with opportunities to closely observe life cycles (Ramey-Gassert, 1997). This fosters an awareness of biological processes and critical left-brained thinking. However, the 'bean-plant on a windowsill' approach lacks the immersive experience that outdoor gardening provides. The limited scope of growing beans in isolation from broader ecologies raises questions about the depth of understanding it imparts regarding fresh fruits and vegetables. In contrast, experiential and place-responsive learning appears to foster a deeper understanding of food origins, resulting in drawings that depict more natural foods.

Our data and visual observations suggest that different pedagogical approaches do result in significant differences in children's food awareness. Children who learn under experiential/place-responsive pedagogies (utilising gardens) tend to associate the word "food" with more fresh fruits and vegetables than those who do not engage in experiential and place-responsive garden-based learning. This highlights the potential importance of gardens as an essential component of effective food education. In the next section, we delve deeper into the

types of food provided by the children and explore the varying presence of place-specific foods in their drawings.

Knowing place through gardening

The Australian Curriculum is a national policy document adapted by schools and teachers for their local contexts (Australian Curriculum and Assessment Reporting Authority, 2023). Our analysis so far suggests the effectiveness of experiential/place-responsive pedagogical approaches in engaging children with their local environment, particularly concerning food. The drawings provided by the children in the experiential stream highlight the power of experiential pedagogies linking children with local produce and demonstrates the importance of place-responsive approaches in building local (food) resilience (Renshaw & Tooth, 2017; Somerville, 2010). As illustrated in Table 6.2 below, the drawings from students in the experiential stream included specific fruits and vegetables cultivated in their school garden (highlighted in green and bolded), and on average drew more place-specific fruits and vegetables.

Table 6.2: Tropical place-specific fruits and vegetables drawn by the students

Drawing	Experiential	Explicit
Avocado		1
Banana	7	2
Coconut		1
Dragon fruit	2	
Eggplant		2
Mango	4	
Pineapple	3	1
Strawberry	6	5
Watermelon	5	
Total	27	12

We observed notable differences across the drawings by students in the experiential and explicit instruction streams. The former predominantly featured local fruits and vegetables, whereas the latter depicted temperate foods like carrots and apples (see Figure 6.5). This distinction is noteworthy and reflects the influence of place exposure. Students in the experiential stream included illustrations of the tropical foods they had grown as part of their learning, which are specific to their climatic location. This suggests that their engagement in gardening activities may contribute to a more meaningful comprehension of local tropical seasonality, a concept extending beyond the traditional European seasons typically emphasised in the Australian Curriculum. This reflects findings from similar studies of children and youth undertaking garden-based learning, who graphically depicted their local environment (inclusive of food, water, and other agricultural elements) in their drawings(Aragón et al., 2023; Eugenio-Gozalbo et al., 2020). Furthermore, in the drawings from the explicit instruction stream, we observed the prevalence of out of place foods, such as pears, onions, apples, and carrots. In fact, no child in the experiential stream drew carrots or onions. These foods, typically associated with temperate climates, are consistently available throughout the year in large supermarket chains. They often constitute children's initial encounters when visiting these stores, with the 'produce' section serving as their primary point of

introduction. This observation underscores the exposure we have to a globalised

food system.

Figure 6.5: Drawings reflecting different local and exotic foods

We thus argue experiential/place-responsive pedagogies help bolster

children's food origin awareness, joining scholars who argue for pedagogical

approaches appropriate to the subject content (Jayanandhan, 2009; Mannion et al., 2013; McNamara & Mcnamara, 1993). Place-responsive pedagogical approaches to food education ensure children have a deeper understanding of 'place.' The drawings presented here, including tropical foods, suggest that time spent engaging with local ecologies shapes a locally relevant food awareness. Experiential/place-responsive pedagogies facilitate a smoother transition for educators seeking to tailor their curriculum to local contexts (Mannion et al., 2013). This helps give children a well-rounded understanding of food origins, given the amount of processed and globalised foods that all children are exposed to—and indeed drew as part of this exercise.

Exposure to media and a globalised food system

A dominant theme across all children's drawings at TNSS was the prevalence of processed and/or branded foods. There was no statistically significant distinction between the two streams in terms of the amount of processed food depicted (59 drawings with processed food across 22 categories). This suggests that children tend to draw what they are familiar with, given their exposure to processed foods at ages 5 and 6 (Bland, 2018; Deguara, 2019). The drawings from both streams provide compelling evidence that children associate food with a globalised and placeless identity (Nelson et al., 2013). We suggest this is due to the exposure to

big-brands and other food with no geography, reflecting a disconnect between food

and specific cultural or geographic origins (Banks & Overton, 2010). An

illustration of this is children's portrayal of big brands in Figure 6.6. Exposure to

the globalised and placeless food economy is perhaps most strikingly depicted

through children's 'brand-food' associations, evident in the drawings of Coca-Cola,

Skittles, M&Ms, and the iconic Golden M of McDonald's. These drawings express

our exposure to globalised food economies that remove us from place (Goodman,

2003). They are placeless and known even to children at a young age.
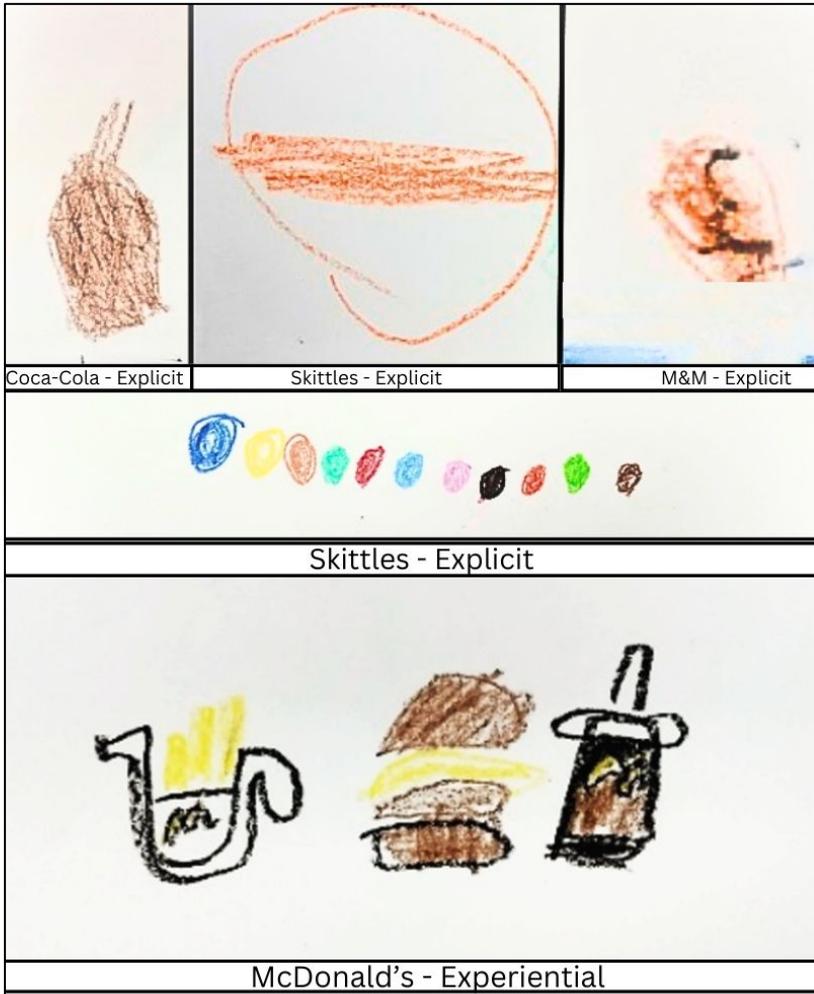
Figure 6.6: Coca-Cola, Skittles (x2), M&M's, and a comforting yet placeless McDonald's

The prevalence of McDonald's across both streams' drawings (two in Experiential and six in Explicit) reinforces arguments concerning children's exposure to big brands. The children clearly enjoy processed foods, which will be of no surprise (many of us do), but the brands themselves are simply an exposure-

based association. There is widespread consensus that heightened familiarity with McDonald's (and other transnational brands) leads to a reduced connection to distinct localities. Regardless of one's location, McDonald's persists as an unwavering presence. The inclusion of the 'Golden M' on chip packets and beverages unveils the extent of the company's impact on a child's food perspectives and ideologies (Haverluk, 2002). By positioning itself as the epitome of enjoyable foods globally (Ram, 2004), McDonald's underscores its dominance in shaping our food-related responses. Food thus transcends its nutritional role to embody traits of branding, capitalism, speed, and convenience (Frankelstein, 1999; Hobin et al., 2012; Ritzer & Miles, 2019; Robinson et al., 2007). McDonald's omnipresence and 'placeless' nature thus symbolises our receding cultural landscapes (Graus, 2017). If our early food associations are shaped by transnational brands, we foster this sense of placelessness.

The powerful influence of media foodscapes in shaping children's mental associations was also revealed through the unexpected inclusion of three dinosaur drawings in the TNSS collection (Figure 6.7). Media foodscapes result from the interplay of place, space, and various elements within the food realm to create associations (Brembeck et al., 2013). The dinosaurs, as seen below, are depicted walking around a forest amongst giant blue mushrooms. When doing the follow up questions, the student highlighted that the forest was a broccoli forest. After

querying why the dinosaurs would be interacting with vegetables, the teacher suggested it could relate to the Australian television show called *Ginger and the Vegesaurs*; an animated series about vegetables and dinosaurs that was streaming at the time of data collection.

Figure 6.7: A Dinosaur in a Broccoli Forest drawn by an explicit instruction student

In the context of our broader argument, gardening serves as an effective avenue for bolstering childrens natural food awareness against the impact of the globalised food and media landscape. While media often promotes branded and placeless foods as appealing, experiential/place-responsive pedagogical approaches,

like gardening, foster a deeper understanding of food origins within local
ecosystems. The inclusion of dinosaur drawings (and big brands) serves as an
illustration of how the media, through television shows and similar outlets, can
influence mental associations in seemingly unrelated contexts. This contrast
underscores the potential for curriculum development to counterbalance the media's
influence, encouraging children to engage critically with their food choices,
embrace local food systems, and make informed decisions in a media-dominated
world.

Conclusion

Exploring the interplay between children, food, and their environment unveils the
significant impact the media, global brands and food with no geography have on
children's perceptions and their connection to the world. These influences,
portrayed in the drawings at TNSS, reshape children's relationship with the origins
of their food, prompting a critical examination of educational approaches. Although
exposure to this globalised food system cannot be prevented, schools can offer
educational experiences that enhance a child's understanding of the origins of food
and the role their local place plays in the food system. The research presented here
suggests experiential/place-responsive pedagogical approaches could be a potent
force. Through tangible experiences and immersive gardening activities, these

pedagogies reintegrate children with their sustenance and surroundings, which can enhance food education beyond explicit pedagogical approaches in Science, Technology, Engineering and Maths (STEM) subjects.

Although home gardening and interest in local food systems has increased in the post-COVID-19 context (Kingsley et al., 2023), this study intentionally did not consider children's experiences with food and gardening at home. Instead, we focus solely on the role of schools and pedagogy in addressing the need for a more interconnected food system. While exposure to globalised food systems is evident in various ways outside school, this study focuses on the school experience and what might be done to combat these placeless images. We emphasise the importance of hands-on experiences in food education—evidenced in our research through the tropical items drawn by the experiential stream. Understanding the constitutive role of home environments is potential way forward for future researchers. Future research exploring students' comprehension of place through pre/post garden program comparisons could also provide a more nuanced understanding of the effects of different pedagogical approaches on food knowledge and sense of place.

The two pedagogical streams at TNSS offer a unique opportunity to understand the impact of each approach on food education. The analysis presented

here suggests that explicit instruction is less able to impart local food knowledge and instil a sense of place in comparison to the experiential/ place-responsive alternative. However, an experiential/ place-responsive approach does not provide the opportunity to conduct isolated and finer-grained observations like growing a singular plant. Balancing the significance of close observations with diverse and unscripted experiences within the garden setting emerges as a promising path. A hybrid approach, rooted in a comprehensive understanding of the importance of both pedagogies, could offer a more nuanced approach to food education within school curricula. It could enhance food awareness through STEM thinking as well as an understanding of the cultural and social values of growing food.

Garden-based learning plays an important role in children's awareness of place. We argue a more well-rounded approach to food education in schools that draws on both pedagogical practices as needed. By weaving plants and food into the curriculum in different ways, schools can nurture the bonds between children, their environment, and local foods in ways that help reduce food vulnerability. Introducing more experiential, hands-on experiences enhances food experiences and encourages dynamic left and right brained thinking. While programs like the Stephanie Alexander Kitchen Garden Program do use gardens, augmenting resources for experiential and place-responsive teaching can mitigate urban food vulnerability and amplify a sense of place. Our data suggests that integrating

experiential and place-responsive pedagogies into schools can foster a locally attuned, nature-centric perspective on food, acting as a counterbalance to the influence of the pervasive globalised food system.

6.2: Chapter summary

By investigating the outcome of varying pedagogical approaches in shaping children's food awareness, this chapter reveals key insights into the impact of experiential and explicit instruction methods. In the Australian educational landscape, explicit instruction stands as a widely adopted, research-backed methodology, designed for streamlined knowledge transfer through a scaffolded "I do, we do, you do" approach (Australian Institute for Teaching and School Leadership, 2023). Contrasting this, experiential and place-responsive pedagogies offer an alternative lens, responding to local contexts and fostering a deeper grasp of climate adaptability, sustainability, and global issues (Renshaw & Tooth, 2017; Somerville, 2010). The chapter's findings feed the notion that pedagogical approaches ought to be tailored and considered for their effectiveness in delivering learning content for each learning area (Jayanandhan, 2009; Mannion et al., 2013; McNamara & McNamara, 1993).

In terms of food education, the findings reveal that experiential/place-responsive pedagogies are better suited for enhancing awareness of both food and place. While all students drew globalised, branded foods, the students immersed in the experiential stream drew significantly more natural and contextually relevant foods. This underscores the potential impact that pedagogical approaches might have in moulding the future of food education. It also provides a sturdy foundation

for ongoing research into crafting pedagogical strategies that authentically connect children with their food, embracing the diverse cultural and geographical origins entwined with it. In the following chapter (Chapter 7), I will revisit all the main findings that I have presented throughout this thesis and discuss what it means for the future of food education in Australian schools. I will also examine how this thesis has been completely shaped by the place in which it was conducted – Gimuy – and what this means for future scholars investigating food, gardens, and EGA. Lastly, I will conclude the thesis by providing recommendations grounded in the findings of the study.

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Chapter 7.0: Conclusion

7.1: Introduction

To begin this thesis, I reflected on my youth and what it meant to engage with and rely on local ecologies by predominantly sourcing food from our garden and raising our own animals. After establishing EGA as a problem, I shared a personal narrative of growing up and realising for the first time the impact that regression from the natural realm had on urbanites' relationship to food. EGA gave a name to the phenomenon I had witnessed as a child and prompted me to wonder whether my connection to food origins was different to my urban peers because I had engaged with the garden from a young age. I used the research in this thesis as a means of exploring this question and through the conversations, witnessing, and physical gardening experiences had while conducting the research, I feel I have found solace for answers that I have long held onto. In terms of the research as a contribution to scholarly knowledge, I examined whether school gardens foster a connection between children and their food, and the environment. This thesis links food disconnection to EGA and explores means of de-escalating the phenomenon through school-based food gardening and pedagogical approaches (highlighted in Chapter's 5 and 6). This final chapter of the thesis, depicted in Figure 7.1, revisits the aims and objectives, and what the significant and key empirical findings of the research are.

First, I will reflect on the role that the local place, tropical Gimuy, played in shaping the results of the study and cast attention to the significance of adopting a place-based research approach when performing research concerned with societies and their environments. Following, I reflect on the pragmatic approach taken to conduct and compile this thesis. The key empirical findings, their significance and contribution to the research field(s) will then be outlined, before finally providing two overall recommendation that are grounded in real-world outcomes.

What role do school gardens play in battling environmental generational amnesia and a lack of food origin awareness?

1.	Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at Tropical North State School?
2.	What are the benefits and barriers to using school-based, and how can the barriers be alleviated?
3.	How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?
4.	How, and does, experiential learning in the garden increase food system awareness and place connection in comparison to explicit instruction learning?
5.	How does gardening help to address the phenomena of EGA?

School-based community gardens battling food disconnection as a manifestation of Environmental Generational Amnesia

Chapter 1

Introduction

Chapter 2

School Gardens: A review on the benefits and barriers

Chapter 3

Mapping the Australian Curriculum

Chapter 4

Doing research with teachers as busy people

Chapter 5
Understanding Environmental Generational Amnesia in school gardens

Chapter 6

Pedagogy, place, and food education

Conclusion
Environmental Amnesia as food origin disconnection can be de-escalated through experiential/place-responsive learning

Figure 7.1: An overview of the thesis structure highlighting what Research Question (in this case RQ5) the chapter is responding to

7.1.1 The role of place in shaping the outcomes of this thesis

This thesis explored EGA through the lens of place-based theories, pedagogy, and at times, recognition of the more-than-human realm (see Chapter 4), to investigate food origin disconnection as a manifestation of EGA. School-based community gardens at TNSS served as the means to examine perceived relationships between humans and the more-than-human, as well as the impact of two different pedagogical approaches on food awareness and sense of place. The key findings revealed that the disassociation from food origins can be viewed as a manifestation of EGA and can be alleviated through experiential and place-responsive pedagogical strategies facilitated by the school garden. However, it is important to note that these findings are both place and context dependent. Lynch and Mannion (2016) contend that place-based data, while potentially relevant to other settings, retains an inseparable connection to its physical surroundings and, as such, becomes a component of the place's distinctive assemblage.

Upon reading Law's (2019) work on tropical backyards shaping tropical identities, I came to realise that the garden in the tropics had indeed shaped my own identity. This led me to wonder if I would discover similar effects of gardens on people through my own research. Throughout this thesis, numerous place-based findings did in fact emerge. In Chapter 4, the challenges posed by the monsoonal

tropical weather were identified as significant barriers to school gardening. It became apparent through the analysis, that time and weather are intrinsically linked as barriers also, as the (limited) time allocated for gardening coincides with the sun at its peak in Queensland. In Chapter 5, interview participants perceived the weather and the presence of other more-than-human entities such as the plants, animals, and insects in the garden as instrumental in teaching children about the tropical identity of Gimuy itself. Finally, Chapter 6 explored how gardening in a tropical climate shaped children's understanding of food, evident in the drawings of tropical fruits and vegetables by students in the experiential stream (Montessori students). After engaging with these findings, I began to witness the role place was playing in shaping children's relationship with the environment in other everyday interactions, including their awareness (or sometimes lack of) of the unique seasonal shifts in the tropics; or their personal observations of the Mango trees flowering early in 2022. To further elaborate on these findings, I share a personal experience I had while running a community gardening program with the children at TNSS.

In March 2023, after conducting all the data collection for my thesis, I was participating in a community gardening session, run every Tuesday during what TNSS calls 'little break', which is a morning tea break. I was excited to be in the garden with the children after hearing about it from my participants during data

collection and ordered a variety of seeds for planting with the children. We had regular children who volunteered at the gardening session, whom I formed a strong bond with as the weeks went on. As the dry season approached, sunflowers became an exciting addition to the garden. The children were elated at the chance to grow something beautiful, and this was reflected in the care they took in planting the seeds. I witnessed in real-time their enhanced moral affiliation towards non-humans in the way they cared for the seeds. We cleared the bed of persistent nutgrass, a weed, and each child carefully and lovingly placed a sunflower seed in a 1cm hole before covering it up – some patting it gently – kissing their fingers before they did so. We filled the watering cans, pressed in labelling cards, and finally watered the seeds. Some students who were highly dedicated to the garden volunteered to 'diligently' water it throughout the week. Unfortunately, only half of the sunflowers sprouted, and they soon withered under the harsh tropical sun. The climate had shifted. March is a temperamental time of year with some years experiencing heavy rainfall, and some years being incredibly dry, resulting in gardens requiring increased watering. March 2023 was particularly dry, and the plants suffered the sudden shock of no rainfall. During a discussion about our misfortune, one of the students admitted that they had not paid attention to the weather and had not realised that the wet season had come to a rapid halt. They had overlooked the cues from the local environment and forgotten about the realities of their place and how

it impacts living things. This lesson was profound for both the children and myself. It also allowed me to witness weather as a major barrier to gardening, just as the teachers had listed during our rapid-walking interviews. After assuring me that they would be more attentive to the weather, we planted some beans, which flourished with regular care and watering. The students, upon picking the beans were shocked when they realised these were the beans many of their parents used in their cooking. One child was adamant they did not like beans but took a small bite because their friends were trying them as well. Their face lit up and they picked more to continue eating at the next break. Their resilience to each setback, increased awareness of their local environment, and willingness to try new foods while creating links to their everyday foods is something I have loved both reading about and witnessing in real-time.

The lessons learnt by these experiences with children in the garden is not an isolated case. Gardens are subject to the influence of weather— and a manifestation of the place itself (Law, 2019). While this example and the entire thesis focuses on the tropics, there is a broader framework that applies regardless of location. The climate, the place, and the more-than-human world shapes our identities and interactions with the environment (Ingold, 2010). This reflection has implications for the overall research findings, as the strategies for mitigating EGA will vary depending on the specific location. While the garden continues to serve as a conduit

for enhancing understanding of food origins and connection to place, the methods employed, and their findings will differ across different climatic and ecological zones. Conducting further research on the nuanced relationships between weather patterns, local ecologies, and the success of place-responsive initiatives in different regions would not only enhance our knowledge on how to increase food origin connection and de-escalate EGA but would also inform the development of more effective and tailored pedagogical approaches. The findings I have presented however, position Gimuy the city, and the surrounding unique tropical landscape/climate, at the core of the thesis. The following section will reflect on how pragmatism as an ontological and epistemological paradigm consistently informed this thesis and whether it proved advantageous for the outcomes of the overall thesis.

7.1.2 How and where pragmatism informed this research

This research applied a pragmatic approach, utilising mixed methods. Informed by the perspectives of Creswell (2020), and Silverman (2011), the methods respond to the ideas put forth by Gibson-Graham (2014), who argue that robust methods should not be grounded in rigid theories, as this disregards personal narratives of individuals involved in the research. According to Gibson-Graham, researchers have a duty to represent the needs and narratives of participants rather than using

methods to serve their own agenda (2014). Rather, methods ought to be adaptable and continuously (re)developed in response to the participants needs. This sentiment also reflects the importance of asking 'how' and not just the 'why' when designing research under a pragmatic epistemology (Morgan, 2014), because conducting research suited to the specific needs of the unique situation and setting is a priority when following this design. I embraced these perspectives by employing a range of adaptable methods that were modified based on the diverse needs of the participants, which proved advantageous for the overall outcome of this thesis. For example, in Chapter 4, when I was presented with the obstacle – and opportunity – of having to conduct research rapidly to meet the needs and availability of those teachers who wanted to participate yet could not afford the time. Being adaptable, flexible, and attuned to participants' needs was beneficial by allowing me to enter the grounds and access an underrepresented and time-poor pool of participants, while also aligning with key principles of pragmatism as a research paradigm (Datta, 1997; Glasgow, 2013; Kelly & Cordeiro, 2020). Again, in Chapter 6, I was presented with the opportunity of doing research with children as participants. By being pragmatic, attuning to their needs and recognising the power play that can occur in interviews (Deguara, 2019), I was forced to consider alternative means of conducting research with them that did not feel extractive.

Drawings, which the children seemed to enjoy and gained their own set of colouring in crayons from, became the ultimate solution.

The research phases in this thesis underscore the importance of conducting research in a logical and sequential manner, guided by pragmatic epistemological frameworks. Firstly, I established the existence of a tangible, real-world problem and bolstered it with additional evidence and in doing so my research aligns with the objectives of pragmatic paradigms, which aim to generate practical understandings and potential solutions for concrete, real-world issues (Kelly & Cordeiro, 2020). Furthermore, my work contributes to the existing literature on children's perceptions of the environment (specifically, food), alongside scholars like Kahn (2002, 2007, 2022) and Kahn and Weiss (2017), and adds adult perspectives on the manifestations of EGA. This contribution creates opportunities for future scholars to analyse the phenomenon from an external standpoint. It is important to note that this contribution would not have been possible without adopting a pragmatic, mixed methods approach and initially conducting interviews to determine the presence of EGA.

7.2: The key empirical findings and their significance and contribution to the research field(s)

7.2.1 A place in the literature: Food origin disconnection and Environmental Generational Amnesia

Today's contemporary era presents numerous challenges, including limited food origin awareness (Anderson, 2015; Artmann et al., 2021) and environmental disconnection (Kahn, 2002, 2022, 2007; Kahn & Weiss, 2017). This research addresses these issues by situating itself within the field of Environmental Education and Human Geography, drawing on place-based and more-than-human agency thinking, and aligning with scholars such as Ingold (2010), Law (2019), and Lynch and Mannion (2021). Furthermore, this research responds to a gap in the literature by empirically linking food origin disconnection to EGA and exploring the role of school-based community gardens in de-escalating the phenomenon.

The empirical findings of this research reveal four key insights:

1. Food origin disconnection can be viewed as a manifestation of EGA.
2. EGA is present at TNSS and manifests in four distinct ways: limited moral affiliation towards the natural realm, underdeveloped motor skills, disconnection from place, and a lack of food origin awareness.
3. Gardening has the potential to de-escalate all manifestations of EGA by building motor skills, fostering environmental stewardship (enhancing moral affiliation), establishing tangible connections between food production and consumption, and immersing children in a sensorial experience of place.

4. Experiential/place-responsive pedagogies outperform the explicit instruction method in teaching Prep and Year 1 children about food origins and place.

The second phase of the research focused on investigating whether EGA was perceived at TNSS. The findings yielded themes that aligned with the manifestation of EGA but also highlighted the power of gardening as a form of tangible environmental contact time to de-escalate it. TNSS community members perceived poor moral affiliation towards the natural environment, underdeveloped motor skills, a disconnection with food origins and a limited awareness of place; thus, confirming the presence of EGA. The interviews conducted in this study shed light on various positive outcomes associated with gardening, as reported by the interviewees. These outcomes include an improved sense of connection and empathy towards more-than-human beings such as bugs, insects, and plants. Additionally, gardening was found to enhance motor skills and promote a deeper awareness of the changing seasons through hands-on experiences. Furthermore, the interactions involved in gardening, including planting, digging, harvesting, preparing, and eating, helped children gain a better understanding of where their food comes from and the process it goes through before reaching their plates.

The drawings created in response to the word "food" from the Prep and Year 1 students across the explicit and experiential streams at TNSS provide concrete,

quantitatively supported evidence. Children in the experiential stream, who are exposed to nature through gardening experiences, have an enhanced awareness of fresh fruit and vegetables over those in the explicit stream who do not engage in regular gardening. The drawings also highlighted that those children who are regularly immersed in their natural environment are predisposed to having a greater connection or understanding of their local place – in this instance, the tropics. This helps us to understand that gardening, as a form of tangible nature contact time, can improve food origin awareness and place connection and effectively de-escalate this manifestation of EGA. The following sections break down the findings in accordance with their overarching Research Question and highlights the scholarly contribution of the research.

7.2.2 Answering the Research Questions

1. Does Environmental Generational Amnesia play a role in lacking food origin awareness, and is it present at TNSS?

Investigating participants' observations of children's motor skill development, moral consideration for non-human entities, improved food origin awareness, and heightened sense of place through embodied weather experiences and growing seasons, provides compelling evidence that gardens serve as an effective means to de-escalate the impact of EGA. The findings from Chapter 5 shed light on the perceived manifestations of EGA among children at TNSS. These manifestations

include lacking moral affiliation towards non-human counterparts, undeveloped motor skills, limited awareness of food origins, and place disconnection. The research findings indicate that parents, teachers, and school staff have observed various forms of environmental disconnection among students at TNSS within each theme of EGA. However, these manifestations of EGA appear to be de-escalated when students are given the opportunity to engage with school gardens. These findings, presented in Chapter 5, make a significant contribution to the fields of Environmental Education and Human Geography as they provide the first empirical evidence linking EGA to food origin awareness and (extend upon understandings of) place disconnection. Prior to this research, knowledge on EGA manifestations was limited to poor motor skills, lacking moral affiliation and place disconnection. Now, food origin disconnection can be considered a manifestation, and we have a more nuanced understanding of how place disconnection can be de-escalated through gardening experiences. This contribution marks a notable advancement in current thinking and understanding within these research disciplines.

2. What are the benefits and barriers of using school-based community gardens, and how are the barriers overcome?

School-based community gardens are hard to maintain due to limited time, funding, and resources (including staff) which limits their uptake in schools (Blair, 2009). As urban greenspaces, however, they are beneficial in food and environmental

connection, they provide effective spaces for educators to deliver curriculum content, and foster health and well-being in children. The literature review in Chapter 2 contributes a synthesised approach to the benefits and barriers of school-based gardens – which as far as I have been able to ascertain – is a first for the education field since Blairs' (2009) call for further research into it. Chapter 4, which presents an innovative methodology, forwards findings that align with the sum of the themes within the literature review chapter. The findings yielded important insights into the impacts that weather, greenspaces, and atmosphere have on both the teachers and students' wellbeing. In doing so, Chapter 4 challenges the collective notion that gardens are beneficial for only students, and that if we prioritised their benefits for teachers too then the barrier of time might be alleviated. The methods deployed when conducting this research made a traditionally inaccessible group of participants, easy to conduct research with, in a way that revealed their every-day lived realities. This paper is significant because it presents an opportunity to do ethically informed research that is also sensitive to the more-than-human realm and time.

3. How can community gardens help effectively deliver curriculum in primary schools while linking to food system awareness?

Community gardens can be integrated into curriculum areas across the board. Findings from Chapter 3 highlight they are most relevant for HASS, HPE and

Science, and least so for Art, Drama, and Dance. Community gardens can enhance

engagement and improve delivery of curricula within primary schools in several

ways. Firstly, community gardens provide hands-on, experiential learning

opportunities that can make abstract concepts more tangible and relatable to

students. For example, for Science, community gardens offer opportunities for

students to observe and study plant life cycles, ecosystems, and the interdependence

of living organisms (Krasny & Tidball, 2009). Community gardens offer the

opportunity for students to engage with both the natural and the built environment,

a theme across the Australian Curriculum's HASS learning area. They can also

engage students in the nutritional value of different plants, encouraging them to

develop healthy eating habits, aligning with HPE learning area content. The

findings of this chapter support sentiments from other scholars who suggest school-

based community gardens are both learning spaces and tools that can enhance the

delivery of Science and HASS curriculum (Baker et al., 2015; Blair, 2009; Bucher,

2017; Christensen & Wistoft, 2019; Wainwright et al., 2020).

4. How, and does, experiential learning in the garden increase food system
   awareness and place connection in comparison to explicit instruction
   learning?

The findings in Chapter 6 highlight an increased awareness of place-appropriate

fruits and vegetables from children who learn under experiential/place-responsive

pedagogies compared to those who learn under explicit instruction with minimal to

no garden contact time. Spending time in the garden exposes children to the origins of their food in a place-sensitive way. The significance of this research presents empirically supported findings on the power of experiential, place-responsive pedagogies in food education, which further supports findings from previous scholars (Beery et al., 2014; Malberg Dyg & Wistoft, 2018). This aligns with the Queensland Department of Education's (2022) policy of using appropriate and differentiated pedagogical approaches, which encourage student empowerment.

5. How does gardening help to address the phenomena of EGA?

The research in Chapter 5 revealed that gardening increases the likelihood that children will develop moral affiliation towards the natural realm, enhanced motor skills, environmental knowledge, a sense of place, and an understanding of where their food comes from (ref). Chapter 6 then extended on the findings regarding food awareness, investigating childrens response to the word food. Results revealed that children who engage regularly with gardens have enhance awareness of fruit and vegetables and more adept understanding of local foods. For these reasons, school gardening programs are seen to be effective in de-escalating the wicked problem of EGA. However, addressing EGA on a large scale is a multifaceted challenge, as all wicked problems are, necessitating additional scholarly research to explore further manifestations and effective de-escalation methods to appropriately address the

phenomena. This research, however, is the first to explicitly focus on de-escalating EGA using school gardening, thus providing a platform for further research.

7.2.3 Relevance of findings to the Queensland Department of Education priority research areas

The findings of the thesis align with the priority research areas of the Queensland Department of Education (2023). These are a set of research areas that the Queensland Department of Education emphasise are key to supporting and promoting for enhanced education for all children in Queensland. This thesis partially provides responses to the following questions in the priority research areas of: 'Empowered Learners,' 'Health and Wellbeing,' and 'Community, Connections and Integration'.

1. Empowered Learners: 'How can schools, regions, and education systems be responsive to key issues identified as important to young people, such as mental health, environmental sustainability, equity, and discrimination?' (Department of Education, 2023b, p. 3)

Mental health and well-being are issues that can be responded to by local schools and regions by building a school garden on the campus. In the data presented in Chapter 5, participants highlighted that children were calmer in the garden, caring

for life outside of themselves when they were given the chance to interact with garden ecologies. Further, participants noted the increased confidence levels they had perceived in children who engaged in regular gardening, the resilience they gained through every setback (I.e., plants dying or being stolen and vandalised), and the overall joy and happiness they had when they found success. The findings highlight that gardens offer an alternative, nature-based way of fostering mental and physical well-being on school campuses.

2. Health and Wellbeing 'How does the physical school environment (e.g., administrative areas, outdoor areas, classrooms, and amenities) affect staff and student health and wellbeing and student learning?' (Department of Education, 2023a, p. 6)

School gardens provide a space on campus where students and staff can engage with the natural environment in a meaningful way, which enhances their mental and physical well-being, this was presented and discussed in Chapter 4. Teachers who were exposed to greenspaces immediately showed signs of their nervous system calming down, which is important in any noisy and chaotic environment (which a school can be). Moreover, the perceptions of interview participants in Chapter 5 revealed that students developed enhanced fine and gross motor skills through

regular gardening. The findings suggest that school-based community gardens are an effective way of improving the staff and students' health and well-being through physical campus design.

3. Community, Connections and Integration: 'How can schools, local communities, organisations and families collaborate to foster a two-way relationship that has benefits for all partners and the holistic needs of learners?' (Department of Education, 2023a, p. 7)

The research in this thesis, particularly in the literature review in Chapter 2, positions the community as a central factor in the success of running and maintaining a school-based community garden. The findings revealed that by engaging with the community as volunteers who help co-manage the space, the barriers of maintanence and time can be alleviated, increasing the potential of the gardens as educational sites for the teachers and students. The garden in turn offers community members alternative pathways for food procurement, fostering positive rapport and a reciprocal relationship. In terms of learning, subjects such as Food Science, Mathematics, Science, HASS, and English can be effectively taught through experiential and place-responsive pedagogical methods using the garden as an outdoor learning environment. This can only be seen as a positive factor in meeting the holstic needs of learners – which may very well be diverse and

different in every situation. Lastly, the research in Chapter 6 then revealed that children who engage regularly with the school gardens have a more adept understanding of local food (in this instance, tropical), and an increased awarenes of fresh fruit and vegetables.

7.3: Opportunities and recommendations

7.3.1 Future research opportunities

The research described in this thesis enhances our understanding of the Montessori method's effectiveness in using experiential and place-responsive pedagogies to de-escalate the phenomena of EGA, while improving food origin connections. There are several areas within the fields of Environmental Education and Human Geography that present exciting opportunities for future research. One potential avenue for future investigation is to explore the concept of place influence on a child's understanding of food. Building upon the immersive garden-based classroom approach discussed in this thesis, researchers can delve deeper into the ways in which geographical locations and cultural contexts shape children's perceptions, attitudes, and behaviours towards food. This line of research would provide valuable insights into the interplay between place, food knowledge, and environmental consciousness.

Additionally, this research highlights the need for further exploration of EGA. While this thesis has established a connection between food disconnection and the manifestation of EGA in children, there is a need to investigate other manifestations of this phenomenon. Already, EGA has been connected to limited moral affiliation towards the natural realm, place-disconnection, and poor motor skills. Future research could explore potential variations of EGA's manifestation, how else does EGA present itself? Furthermore, considering the role of place in shaping and influencing these manifestations would provide a comprehensive understanding of the socio-cultural factors contributing to EGA and the potential strategies for mitigating its effects. How many other disassociations are driven by our disconnection from nature and the amnesia this causes, and how do we de-escalate them? Future research opportunities lie in investigating the various domains, such as health, sustainability, or cultural identity, where disconnection from nature may lead to more detrimental consequences. Understanding these connections and exploring strategies to de-escalate such disassociation would have broad implications for individual and societal wellbeing.

In conclusion, future research endeavours should focus on investigating the influence of place on children's understanding of food, exploring other manifestations of EGA, and examining broader implications of disconnection from nature. By expanding our knowledge in these areas, we can develop more effective

educational strategies, inform policy interventions, and focus on fostering a deeper sense of environmental awareness and connection in both children and communities.

7.3.2 Recommendations

Recommendation 1: Increased resources for Queensland primary school greenspace development

I recommend an increase in the funding available for greenspace resources – with a justification as to why, and how. The recommendation is based on the empirical findings within this thesis, such as funding, time, and curriculum integration as barriers, and the well-being benefits from engaging in school gardens. As this thesis deals with real-world problems and roots itself in the education system, the recommendation is made with a view to enhancing education on food, the environment and community connection.

During the time of writing this thesis in 2023, the Queensland Government released a grant for urban green spaces that either a) enhanced the vitality or infrastructure of a current community garden, or b) proposed the development of a new community garden (Queensland Government, 2023). These grants were publicly available through the *Community Sustainability Spaces* grant scheme, and it was developed with the hopes that Queenslanders would "make the sunshine state

the community garden capital of Australia" (Anastasia Palaszczuk for the Queensland Government, 2023). This grant, however, excluded schools and school grounds from the grant scheme.

There are over 1262 state schools and 552 independent and catholic schools in Queensland – 927 of which are primary schools (Department of Education, 2023b). This means, that if the Queensland Government were to open a grant scheme or allocate a set amount of funds towards each primary school in Queensland to either a) enhance the vitality or infrastructure of their current community garden, or b) develop a new community garden on their campus, then every single child in Queensland would have access to these valuable greenspaces, and the resources that teachers struggle to make available in their schools, would become easily accessible.

Gardens enhance the delivery of curriculum content in the HASS, HPE, Science, and Technology learning areas, and encourage children to (re)connect with nature. As seen in Chapter 4, teachers need the time, funding, and facilities to be able to successfully manage and run school gardens. A grant that allows every primary school in Queensland to build the infrastructure for their school garden would mean that every child can engage with food in this meaningful way. By providing the infrastructure via funds, the Queensland Government would be

alleviating many of the pressures and barriers involved in building and managing successful school gardens. Moreover, it would mean that those schools with less funding, or those in poor socio-economic areas, do not miss out.

Chapter 5 highlighted how important gardens are for at-risk youth in building their own sense of self-respect, respect for others, and for the environment. It further highlighted how imperative garden time is for building a basic, functioning level of fine and gross motor skills, while also contributing to a child's development of moral affiliation towards non-human counterparts. Such capabilities are essential to learn and enhance should we wish to move forwards as a society that is facing the ongoing issue of climate change and increased urbanisation. Gardens in schools offer children the chance to become functioning members of society through tangible, real-world experiences within the safety of the nurturing school environment.

School-based community gardens can increase the vitality and connection of the surrounding neighbourhoods (Hardy & Grootenboer, 2013). While I did not investigate this theory myself, it unfurled as the key finding in the literature review in Chapter 2, and again in the interviews. Moreover, as someone physically entering the school grounds and participating in gardening with the children and staff in my own free time, I began to witness the connection and alternative means

of food procurement in personal. By engaging with the broader community through community gardening, schools can increase the food resilience of their catchment area (as highlighted by Reis and Ferreira ([2015]) while also fostering a felt sense of belonging. This is particularly important for communities of displaced individuals who have been exposed to extreme climate events (Koay & Dillon, 2020; Reis & Ferreira, 2015). Following the catastrophic events of 2019 – 2022 with fires in Australia, America, and Greece, COVID-19, and floods across southern Australian states – few things could be considered so important.

Food education works best when the pedagogical approach provides for experiential, hands-on garden experiences. This was explored and unpacked in Chapter 6. The Queensland Department of Education (2022) recommends using evidence-based pedagogies to deliver curriculum content that is best suited to the learning area/discipline. Findings from this research reflect that food education is most effective when it is delivered through experiential/place-responsive pedagogies – as they bolster a child's connection to food more than an explicit pedagogical approach, which is the current predominant pedagogical approach in many FNQ schools.

It is for these reasons that I recommend to the Queensland Government that a basic financial grant be made available to all primary schools in Queensland to

increase the resources available to teachers for gardens. While community gardens in the public sphere have received amounts up to $50,000, with over $21 million allocated to the overall grant scheme, schools were not included. Even by allocating an extra $5000 to each of the 927 primary schools, the Queensland Government would still only be giving the Queensland Department of Education a sum of $4,635,000[9]. Lastly, this would ensure that more than 927 community gardens are built in Queensland without placing strain on teachers, and schools, to find the time to acquire funds – propelling the state further towards the title of the 'Community Garden Capital' while further enhancing the quality of education and accessibility in Queensland schools.

Recommendation 2: Queensland Education Community Garden Guidebook for Educators and Schools

The second recommendation for this thesis comes as a result of both collecting the data and experiencing first-hand the difficulty of setting up and maintaining a garden in a primary school. The literature review and interviews revealed the difficulty in funding, managing, and integrating gardens into the school effectively. Moreover, many current garden programs fail to acknowledge the different needs of

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[9] 5000 x 927 (Queensland primary schools) is approximately 4,635,000 and is based roughly off the cost for a school community garden (dependant on the region and availability of resources)

different places, leaving it up to the teachers to understand their environment themselves. As such, I recommend providing funding to design a community garden guidebook for educators and schools that is endorsed by the Department of Education. This guidebook ought to draw on academic findings and have both set-up and establishment protocols, information for principals and educators, class activities that align with the curriculum, and suggestions on adapting it to suit the diverse local environments. Currently, the Department of Education endorse the Stephanie Alexander Kitchen Garden program, but this program is not readily available in every school due to the associated initial membership fee of $1650 (Stephanie Alexander Kitchen Garden Foundation, 2023), and the outset of finances for the set-up of garden and kitchen spaces. Either funding the program for *every* school in Queensland ($1,529,550 for the first year and $407,880 in subsequent years[10]) or devoting funding and time to developing a comprehensive and freely available community garden guidebook for educators and schools, is recommended.

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[10] $1650 x 927 (number of primary schools currently in Queensland) = $1,529,550

$440 (second year renewal) x 927 = $407,880

7.4: Conclusion

The research in this thesis sheds light on the phenomenon of EGA and its connection to food origin disconnection. The findings underscore the potential of school-based community gardens to deliver content in a hands-on, experiential, and place-responsive manner, fostering a stronger sense of environmental belonging and mitigating the effects of EGA. Additionally, this study emphasises the importance of providing green spaces on campus not only for students but also for teachers, as they can offer much-needed relief. However, addressing the constraints faced by teachers requires increased resources for primary schools in Queensland or fostering partnerships with the broader community. Furthermore, the results highlight that children who engage in gardening activities exhibit a greater understanding of the local specificities of their food and a heightened awareness of their surrounding ecologies and natural environment. Ultimately, this thesis establishes the validity of incorporating gardens as place-responsive green spaces to deliver learning content embedded within the Australian Curriculum, benefitting not only students but also teachers in their professional practice and de-escalating EGA in the process.

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Chapter 8.0: Appendices

This section contains two other manuscripts that were published throughout the duration of my PhD. They have been selected to be attached given their relevant themes of community gardens, urbanisation, food, more-than-human thinking, and in many ways acted as sources of inspiration for the thinking that went on for this thesis. The first is a review of "Food, Senses, and the City" which was published as part of the Routledge Studies in Food, Society and the Environment, Edited by Edwards et al. (2021). The second is a first authored paper titled "Building community (gardens) on university campuses: masterplanning green-infrastructure for a post-COVID moment" by Walshe and Law (2022).

8.1: Food, Senses and the City

Food, Senses and the City Food, Senses and the City explores how sensorial experiences of food create new meanings and understandings of the city. In the process, the book extends conversations about the role food plays in shaping our identities (Baker, 2004; Bourdieu, 1984; Law, 2001; Sutton, 2010). Each chapter presents new accounts of how our senses of olfaction, gustation, vision, audition, tactility, and kinaesthesia increase individual, communal, and socio-cultural connections to food, and readers are thus encouraged to understand the sensory totality of food. Indeed, the editors and authors set out to break down how the senses shape the stories that make cities' identities. In each chapter, dynamic social processes, emotions, and cross-cultural experiences that dominate documented (food-oriented) transactions are used to highlight the importance of theories related to sociality, commensality, and conviviality that are set out in the preface. With such theories in mind, the writers aim to show how connections to cultures, cities, and selves are sensual embodiments of lived food experiences. The book is divided into three sections with overarching themes, and this review reflects especially on the commonalities and differences of themes in each. Section 1, The City and its

Other, helps situate the senses of food in the urban. Section 2, Past in the present: memory and food, tells the stories of how food transcends time, space, and place. Section 3, Disrupting and reimagining our cities and diets, focuses on the future of our consumption and cultivation of food in the face of "unstoppable" urbanisation. The sections explore the present, the past, and the future of food and the senses. While each chapter contributes to an enjoyable, insightful experience for anyone reading the book, it is the innovative presentation that stands out, as two examples show. In Chapter 5, Sensing vernacular Chennai, not Madras – a photo-essay, Gerritson documents sight and touch. The presentation helps convey how food is more than a taste experience; it is full, lived, and all-encompassing. Intending to create a "disjointed" chapter, Gerritson successfully deploys a more-than-human way to illustrate the chaotic qualities of a market food tour in Chennai. In Chapter 14, Disrupting and reimagining our cities and diets, Earl transports the reader to peri-urban Vietnamese family homes. Using short and sharp sentences that capture in shorthand a long-term ethnographic study, Earl describes what was felt and happened rather than focusing on what was said. This fast-paced, lay language immerses the reader into a hot, sticky, sweaty situation where children and chickens run amok. The lively expression is a standout way to express how individuals' stories slowly influence the evolution of the city. Whether inside four walls, or on produce journeys from rural farms to urban markets, meaning is created and the

city's food identity shifts. The style of delivery encourages a reading of this chapter with all the senses. What senses shape our (re)engagement with nature and self?

The chapters in Section 1 extends conversations about the capacity of activism to create a stronger sense of community through shared sensorial experiences and about the benefits that might arise from that activism. Walstra (Chapter 2) invites us to understand how digging into soil (the title of Chapter 2) evokes a societal, sensually driven desire to reconnect with both nature and food. Walstra's work concurs with that of others by exploring how "typical" urbanites are confronted by both urban gardening and the senses it (re)awakens (see Baker, 2004). In Chapter 3, Counihan extends such conversations, outlining how an archetypical Italian identity has been built around both food and the city for centuries and showing how gardening connects the country and its citizens. Both Chapters 2 and 3, then, focus on how people (re)connect mind/body/senses with the natural realm by participating in agricultural practices, and both address how such participation can heal societal fractures arising from urban living. Both also position the reader to question the "mastery of all things ontology" fostered by capitalist ideologies. In Chapter 4, Edwards uses a more-than-human lens to understand the (re)connection that bee farmers have to the non-human world and to show how attunement to the needs of non-human species can shape stewardship of the urban environment. The chapter is a key contribution to understanding the role that urban food production

plays in creating multispecies cities and extends upon conversations on becoming with (Haraway, 2008) by sensing across possibilities of becoming the other, allowing people to connect to the nature–culture dyad (see Whatmore, 2002). In summary, Section 1 tends to focus on the now of the senses and on how, when challenged by ideas about the value of green spaces, they can reshape what it means to exist in the urban. In the process, each chapter highlights how food activists help form lived, more than-human, sensual examples of the city.

Nostalgia is a key theme explored in Section 2 and that reminds readers of how smell helps people to transcend time and exist somewhere else for a moment. Chapters draw on food's ability to signify political notions of world history. Authors delve into the historical connections that food and food practices have in daily lives and consider the ways in which food has shaped cultural identity globally: from the meaning of Amba (mango chutney) in Israeli Jewish communities (Chapter 6) to the gendered significance of Thuringian festive cakes in Berlin and the invocation of Heimat (home) their consumption creates (Chapter 7). Section 2 also fosters opportunities for conversations on place and belonging in the face of displacement and on how sense of place can be evoked by senses involved in food-driven practices. Chapters 8 and 9 explore the sensory quest to access home in migrant foodscapes. In Chapter 8, The taste of home migrant foodscapes in marketplaces in Shantou, China, Chen explores how migrants create

a sense of belonging in an unfamiliar socio-political environment by selecting and sourcing foods that evoke a sense of home. A strong migrant presence has ultimately contributed to a shifting and divided foodscape in Shantou, which is evident in the advent of a market that explicitly caters to migrant flavours and tastes. In Chapter 9, Bhattacharya extends upon the importance of creating a familiar cultural foodscape by using an autoethnographic approach to describe how migrants have found home (originally is an act of resilience to the onslaught of the gentrified "foodie" culture. Later, frayed ontologies and cultural resilience are explored in Chapter 16, as Paz Saavedra and colleagues focus on a traditional Andean dish to show how traditional methods of preparation and cultivation are under threat and to underscore the point that the socio-political navigation of food is challenged as cities evolve, threatening to eradicate old ways of knowing, being, and sensing.

Creating or finding a narrative throughline in an edited or compiled book can prove difficult, but clearly connecting the chapters in this volume are themes related to gender, body, identity, class, mobility, and ethnicity. A strong focus throughout on diaspora and belonging challenges the understanding that food is rooted in a place and insinuates, rather, that place is rooted in food. The consistent use of similar ethnographic methodologies smooths any tendency to fragmentation. Methodologies using participant observation, interviews, and casual conversations

are most often deployed to understand food transactions described throughout. Notwithstanding these strengths, the editors acknowledge that they miss an opportunity to include Indigenous voices and flag it for potential future research area which seems odd given the massive literature on that topic already. The book does, however, offer a valuable contribution to scholarship on food and urban studies by opposing the idea that the more we move into the anthropocentric urban, the more we forget and lose (Kahn, 2002). Consideration of both time and place reshapes narratives about how humans make meaning from the senses. Evidence is provided for how people create connection to culture, self, and the environment by igniting the senses and food is at the core of sensorial experiences. In the process, the places, cultures, and histories explored in the book highlight similarities hidden within diversity and an argument is sustained that people maintain culture by using the senses. In this book, then, authors and editors attempt to capture how sensory experiences shape the city. In the process, it allows readers to understand, first, how food activism challenges urban ways of being through the senses; second, how our sensual memories evoke a sense of belonging, especially for the global diaspora; and third, how cultural and traditional food practices could be under fire and yet remain resilient in the face of urbanisation and gentrification by being a lived, sensed experience.

Food, Senses and the City. Ferne Edwards, Roos Gerritsen, Grit Wesser, editors, Routledge, London and New York (Routledge Studies in Food, Society and the Environment), 2021, xv + 250 pp, 48 B/W Illustrations, AUD$201.60 ISBN: 978-0-367-45823-2 (hdbk), AUD $76.47 ISBN: 978-1-003-02558-0 (ebk)

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8.2: Building community (gardens) on university campuses: masterplanning green-infrastructure for a post-COVID moment

The following paper is published under: Walshe, Rachael, and Lisa Law. "Building Community (Gardens) on University Campuses: Masterplanning Green-Infrastructure for a Post-COVID Moment." *Landscape Research*, June 28, 2022, 1–12. https://doi.org/10.1080/01426397.2022.2090530.

Introduction

Community gardens are friendly, multicultural spaces where the community can engage in safe, meaningful interaction (Cumbers, Shaw, Crossan, & McMaster, 2018). They are typically a type of collectively managed and gardened block of land that fills an urban void (Shinew et al., 2004; Cabral et al., 2017). For individuals, they offer a space to cultivate plants of their choosing, such as flowers or vegetables, and in so doing, they promote cultural and social sustainability through building social capital (Anderson, Maher, & Wright, 2018; Firth, Maye, & Pearson, 2011). As green spaces in urban environments, they also provide relief to the (sometimes) monotonous aesthetics of the 'concrete jungle' or city (Shinew et al., 2004; Cabral et al., 2017). This paper examines com- munity gardens (hereafter referred to as CGs) on university campuses, exploring their potential as green infrastructure for building a sense of place and community. Re-building community

is at the forefront of many university's agendas in light of COVID-19. This paper builds on existing reviews of campus gardens that explore their significance to communities, universities and the wider environment (e.g. Laycock Pedersen & Robinson, 2018). We use a valuable but relatively under-utilized data source for exploring how the planned physical environment can influence and support community building and a sense of place: the campus masterplan.

University masterplans are strategic documents that set a vision and precedents for future campus development. Although their focus is on the physical development of the campus, their 'civic' intentions can encourage social cohesion by instilling a greater sense of identity and com- munity. A 'community morale' is embedded in most strategic planning documents (Bacevice & Dunkley, 2018), making campus masterplans a novel data source for understanding interrelation- ships between landscape, place and identity in the university sector. Indeed, a growing number of researchers examine how the design of the physical campus landscape has the power not only to attract students but to increase satisfaction and retention rates as well as overall graduation outcomes (Spooner, 2019; Coulson, Roberts, & Taylor, 2015; Hajrasouliha, 2017a, 2017b; Zhao & Kuh, 2004). A well-designed campus is increasingly understood as important to the core business of universities. It is often expressed as a mixed-use, compact, well-connected and structured environment

with good green spaces (Hajrasouliha, 2017a, p. 167) University campuses bring vibrancy and connection to urban areas; they are place builders (Brennan & Cochran, 2019). CGs build social capital (Dolley, 2020), foster dynamic social interactions (Saldivar-Tanaka & Krasny, 2004; Shinew et al., 2004), contribute to building a sense of community (Saldivar-Tanaka & Krasny, 2004), integrate migrant communities (Moulin-Doos, 2014), and build common ground amongst individuals and groups (Huron, 2015). University CGs can therefore act as hubs for integration and social capital, while at the same time connecting the university community to the campus itself as well as the broader neighbourhood. This paper enhances the existing literature about campus CGs by highlighting the strategic role of campus master plans; it also contributes a finer-grained understanding of CGs as a type of green infrastructure in campus master planning.

To explore these ideas the discussion is organised as follows. We first chart the role of gardens on university campuses, and how they shape the community and contribute to place building. This is followed by the methodology for the research, outlining the case study method and how the masterplans of six universities were selected and analysed. The following sections detail how the case studies strategically align the community building and/or sense of place-related visions in campus masterplans. We conclude by suggesting the importance of including

gardens in university strategic visions and reflect on how they might help re-establish student life post-COVID.

Community gardens on university campuses

CGs are outdoor green spaces that provide a reprieve from indoor environments while at the same time allowing for social distancing and building community. The COVID-19 pandemic has shown that having viable community spaces that can accommodate social distancing restrictions is essential for future campus planning. Reviving life on university campuses post-COVID-19 is now an urgent priority for universities making use of new online technologies that see many students opt for virtual learning. CGs could be part of the answer to rebuilding student life.

Scholars researching university gardens tend to focus on issues of sustainability or student wellbeing (Anderson et al., 2018; De Young, Scheuer, Roush, & Kozeleski, 2016; Laycock Pedersen & Robinson, 2018). Some suggest that green spaces and gardens provide significant mental benefits to university students while also creating a sense of belonging that is essential to student wellbeing. Lau and Yang (2009) argue that due to the high-stress levels associated with higher education, university students are particularly susceptible to the healing abilities of gardens.

Marsh et al. (2020) suggest that campus gardens provide enough reprieve for students to recover from cognitive fatigue. Green spaces provide a context to facilitate social interaction on campus and thus bolster student health and resilience–which is particularly relevant in maintaining wellbeing post-COVID-19 (World Health Organisation, 2020). Outdoor spaces such as CGs have already received attention as important place-makers in the COVID-19 moment (Dingwall, 2020), with emphasis on their resilience and reliability for food supplies.

Campus Planning and design is one avenue for exploring how the planned physical landscapes of universities shape 'place' and 'community', as these are created through physical presence and social connection on campus (Spooner, 2019). Scholars researching CGs emphasise their ability to create a meaningful 'sense of place' (Cumbers et al., 2018; Dolley, 2020; Kingsley, Townsend, & Henderson-Wilson, 2009; Rice et al., 2018). Such place attachment is created by tending to or cultivating the land (Baker, 2004), engaging in meaningful, positive social interactions (Dolley, 2020; Kingsley et al., 2009) and/or understanding local environmental processes and landscapes (Law, 2019). Indeed, Dolley (2020) suggests that CGs are dynamic sites of place-making—transforming space into place, connecting people to place and adding value to the public realm—themes relevant to campus master planning.

The location and accessibility of CGs are paramount to student motivation and participation (Dolley, 2020; Jettner, 2017; Kingsley et al., 2009) and strategic planning for campus CGs is critical to their success—which is even more evident given the university's inherently transient population (Laycock Pedersen, 2020).

Building a sense of place and belonging by participating in a CG also encourages community and citizenship (Baker, 2004)—an important dimension of university life. On the one hand, CGs empower individuals through self-agency (Cumbers et al., 2018), allowing for the expression of self in choosing bed layout, design and plants. On the other hand, gardeners cross everyday socio-cultural boundaries as part of garden activities, which breaks down social stigmas and barriers (Firth et al., 2011) and facilitates tolerance and cross-cultural communication (Shinew et al., 2004). In this way gardens create a community of diverse members: they are the cultural, social, emotional and physical culmination of the lives lived within and outside of the garden (Datta, 2016). This is often why migrants are encouraged to participate in CGs in their place of residence, as it encourages representation and attachment (or belonging) to a new environment, together, and on their own terms (Cushing, Beazley, & Law, 2017; Kingsley et al., 2009 Moulin- Doos, 2014). CGs are thus a dynamic space that contributes to building a sense of place and community among diverse groups in ways relevant to the university sector.

In the analysis below we consider these themes of place and community building in tandem with campus master planning documents to understand how CGs can better support strategic master planning goals. But first, we outline the methodology used

Methodology

Yin's (2009) multiple case study methodology, which compares themes across (and links between) case studies, was used for this research. This approach enabled us to analyse the master plans of each university while at the same time exploring the similarities and differences across the strategic use of gardens at different universities. The primary data source for the research was the campus master plan—an under-utilised strategic document that shapes the built landscape and civic visioning of university campuses. Six different masterplans were selected to reflect Australian universities varying in age, size, prestige, and location:

- Australian National University (ANU), 2020
- James Cook University (JCU)
- La Trobe University (LTU)
- University of Canberra (UC), 2020
- University of Melbourne (UM), 2008
- University of the Sunshine Coast, 2020a

Table 8.1. Case study comparative analysis

Masterplan analysis						
Question	ANU	JCU	LTU	UC	UM	USC
Is the garden embedded within any goals, objectives or principles?	No	No	No	No	No	**No**
Is the garden present on a map?	No	Yes	No	No	No	**No**

Is the garden mentioned in the masterplan?	No	Yes	Yes	No	No	**Yes**
Supportive information Combined staff/student initiative?	No	Yes	Yes	No	No	**No**
Campus type	**Urban**	**Suburban**	**Urban**	**Suburban**	**Urban**	**Suburban**

Universities were selected on the basis that they had 1) an active CG, and 2) a master plan available for public download. A publicly available/downloadable masterplan was deemed important, as these documents are public commitments to improving civic intention. Working within Yin's (2009) framework, the six case studies were considered adequate for triangulation of common themes and patterns. Additional online information regarding each case study was collected to complement the master plan analysis. This included both the history of the garden from gardening club social media sites and university webpages. The following questions were asked of each case study:

- Is the garden present on any campus maps? (the masterplan campus map)
- Is the garden an institution, staff, or student initiative? Is it a mix? (sourced from social media sites and webpages)
- How does the university prioritise establishing a sense of place and community building?

While the masterplans are discussed as an entire document, the research focused on the strategic planning goals (and their sub-goals), maps, images, and forewords. We sought to understand whether their campus CG was 1) included in any way in the document, and 2) how and whether the university recognised the institutional value of campus gardens in their strategic vision.

Each university uses different words to outline strategic visions: some use 'goal', while others use 'objective' or 'principle'. For ease of reading, this paper only refers to these as goals. Using keywords from the CG literature, master plan goals were thematically categorised to assess if they were community-building and/or sense of place oriented. Keywords included: belonging, commonality, community, community development, community 'hub' or 'heart', community engagement, connection, engagement, greenspace, interaction, leisure, participation, place, sense of place, social space, and wellbeing. The analysis of this analysis is presented below.

Masterplan analysis: Legibility, sense of place and building community

This section of the paper examines each university's masterplan overarching goals and demonstrates how CGs are embedded within, or align with, these strategy documents. Table 1 summarises some helpful similarities and differences for our discussion in terms of how the gardens are organised, how 'visible' they are in masterplans and the 'type' of campus each garden belongs to. We deem the visibility of gardens as significant, as this correlates to how 'legible' the gardens are on campus (Lynch, 1960; Turk, Sen, & Ozyavuz, 2015). We also suggest the dynamics of placemaking differ depending on whether the campus is urban or suburban (Hajrasouliha, 2017a; Lau, Gou, & Liu, 2014). Our main task is to

examine the themes emerging from the case study/ thematic analysis: the sense of place and on-campus and neighbourhood community building. Each master plan aims for a distinctive 'campus identity', which is cultivated in different ways, and we elaborate on these and highlight how gardens can help universities achieve them.

Figure 8.1. Map of JCU Nguma-Bada (Cairns) campus showing the garden's location in the key and on the map (adapted from James Cook University, 2019)

Laycock Pedersen (2020) review of CGs on university campuses stresses key factors for creating and maintaining successful gardens. Location, signage and whether gardens are staff/student or institution initiated all heavily influence participation and success (see also Dolley, 2020; Kingsley et al., 2009; Saldivar-Tanaka & Krasny, 2004). As highlighted in Table 1, however, only LTU and JCU are combined institution and staff/student efforts, suggesting their more likely

success in the long term. Furthermore, only JCU includes the garden's location in their masterplan campus map, which can be seen in Figure 1.

This visibility to building/estate managers (and beyond) could prove significant as participation can dwindle if stakeholders are not aware of the garden's presence (cf. Laycock Pedersen & Robinson, 2018). While no university includes the CGs in their organising goals, USC does include the CG in section *A.2 University Programs in Support of the 2012 Campus Master Plan* (USC, p. 1, 2012), suggesting their garden is regarded as an asset or tool supporting masterplan goals. Similarly, LTU recognise the importance of CGs in the *Housing Strategy* section of their master plan (La Trobe University, 2014, p. 92). Formal inclusion in these plans suggests a recognition of their garden's capacity to contribute to the civic vision of the campus as a meaningful, multipurpose green infrastructure. However, as not one university includes the campus CG as a planning tool in their organising goals, objectives, or principles within the masterplan documents, this discussion ultimately focuses on how CGs can align with their visions for place-making and community building.

Hajrasouliha's (2017a) index measuring the physical qualities of university campuses, the Campus Score, suggests the following factors shape a 'well designed' campus: land use organisation, compactness, connectivity, configuration,

campus living, greenness and context. The Campus Score emphasises the importance of green spaces which encourage social connectedness, and increase student wellbeing, sense of community and overall enjoyment. For urban campuses in highly dense areas in particular, green spaces improve student wellbeing (Lau et al., 2014). As CGs are green spaces built on fostering social connection, their strategic use would directly contribute to a university's Campus Score, which has a strong correlation to student retention. In brief, CGs align with what planning scholars call 'good campus planning' even if they are not well documented in university master plans.

Table 8.2 Sample text from masterplans that prioritise developing a sense of place and building the on-campus community

University	Goal
ANU	Create spaces for both quiet contemplation and active collaboration Create lively, and high-quality shared spaces designed to foster a distinctive ANU culture (p. 5)

	Living spaces and workplaces will be located in hubs alongside promenades. Buildings and public spaces will be designed to maximise community safety and interactivity. The landscape setting and bush-campus environment will provide ample opportunity for recreation and enjoyment (p. 133)
JCU	Provide flexible venues that encourage collaboration and interdisciplinary interaction (p. 12)
LTU	Increased lifestyle entertainment, recreation and social opportunities in and around campus (p. 94) Expanded opportunities for social interaction (p. 94)
UC	Create a strong campus identity with a distinctive sense of place
USC	Create physical infrastructure throughout the campus, such as buildings, infrastructure, landscapes and, campus art which contribute to and help sustain a more vibrant and active social life

	Develop existing and future places on-campus in order to form a centre, somewhere acknowledged by students as their university's heart (p. 11)
UM	Foster the development of scholarly communities through cognate clustering disciplines, recognising that we must continually reassess how best to maximise the use of our campus spaces to create optimal learning environments (p. 54)

Creating a campus identity is part of each university's overall vision. USC presents itself as a sustainable university; LTU a university for 'the community'; and UC endeavours to represent the identity of its location: Canberra (which is a mix of bush and city). ANU, JCU and UM deploy notions of place and environment to express their identities: ANU identifies as a 'bush campus' in the city; JCU a university in and for the 'tropics'; and UM as the university in the 'city'. University CGs are usually sustainability initiatives (Laycock Pedersen, 2020) and the visibility of USC's Garden in its master plan contributes to its identity as a sustainable campus. CGs are key public spaces for civic engagement (Baker, 2004; Dolley, 2020), making them great assets for LTU's vision of itself as a university for the community. JCU and ANU could certainly explore how their gardens are environmental place makers, where staff, students, and the wider community directly engage with their 'tropical' or 'bush' identities (eg growing 'native' foods). JCU's master plan uses a tropical palette, and yet they fall short of outlining how tropical edible species (such as those in their current CG) can enhance this. ANU, on the other hand, understands the value of traditional bush foods, envisioning increasing engagement with the local creek by using native foods and fibres for revegetation (ANU, p. 138, 2018). Surprisingly they do not make connections to how their CG could also facilitate this. Strategically recognising their current CG as

a valuable green space could help UM not just establish 'urban intimacy' (Melbourne University Community Garden, 2008, p. 13), but set itself up as the university for the city community by inviting people in to engage physically with their landscape.

Fostering identity and a sense of place is accomplished through campus master planning and design and through creating contexts that foster civic engagement amongst students, staff and the broader community. Although only JCU, LTU and USC have explicit mention (or mapping) of their gardens in their masterplans, all of the universities prioritise creating a sense of place and community. Developing a sense of place – a sense of belonging to the built, natural and social environment (Rice et al., 2018) – is a key aspect of community building in CGs (Agustina & Beilin, 2012; Kingsley & Townsend, 2006). Campus sense of place is essential for student retention (Hajrasouliha, 2017a, 2017b), and could also prove significant in retaining university staff (cf. Wardner, 2012). Table 2 is a selection of goals from the case studies that reflect building a sense of place and/or on-campus community development.

The universities discussed here either have goals that explicitly mention identity and sense of place as an outright goal for their masterplan (eg UC), or the masterplan suggests the importance of a range of types of places on campus and

how they support campus community life (e.g. spaces for contemplation, interaction, recreation, socialising).

For example, ANU's goal encourages fostering a safe and interactive community that utilises the bush-campus environment for recreation. Providing safety in a natural environment is a key feature of CGs (Cumbers et al., 2018), that contributes to a shared value of safety in the community. They are also spaces where native edible species can be grown, contributing to the bush-campus landscape in an interactive and engaging way. Envisioning the garden as a placemaking tool in campus planning would thus complement ANU's desire for the bush environment to be a used focal point by the community on campus. For JCU, though they also fail to recognise the garden in their master plan as a place-making tool, the garden contributes to the 'tropical' identity they are embracing. JCU's garden is officially known as 'Mayi Tjulnim Ma Bugara', which is representative of the tropical species growing in it, and is the local Indigenous word meaning fruits, berries, and food from the rainforest trees (James Cook University Community Garden, 2022).

Collaboration and social interaction are expressed in goals relating to on-campus community building. ANU expresses the need for 'active collaboration'; while JCU stresses the need for 'flexible venues that encourage collaboration'. LTU highlights

the importance of 'social interaction', USC discusses 'active social life', and UM highlights 'scholarly communities'.

We recognise the power of CGs in creating an active, dynamic, and shared community experience, whilst also allowing for quiet contemplation and participation in 'healing' activities (gardening) (Lau & Yang, 2009). ANU's goal explicitly calls for the creation of such spaces, in order to encourage 'collaboration'. Similarly, JCU has a goal to foster spaces for collaborative, recreational enjoyment (Table 2). Gardens can help achieve these goals, but universities must also ensure commonality and a sense of shared purpose is developed outside of the classroom if they wish for collaborative communities.

A strong theme throughout UM's masterplan is creating a shared sense of identity and scholarly community through campus design. Scholarly communities are fostered by placing staff and students into disciplines with discrete locations on campus. Surrounding students and faculty with a community that shares similar academic interests helps encourage commonality. The master plan also suggests the need to keep students and staff on campus by creating alternative spaces where social interaction across all disciplines can take place, thus fostering a shared sense of identity. As the 'city' university, UM establish its identity by boasting

architecturally exceptional and historic buildings, or buildings that blend into the city streetscape.

They also recognise the power that alternative spaces, such as green spaces, hold in providing joy for students (van den Bogerd, Dijkstra, Seidell, & Maas, 2018) and reprieve in city environments. UM outline how lawns and gardens will create opportunities for outdoor interaction, comfort, and intimacy. Yet there is no mention of using a CG as an intimate outdoor location in UM's masterplan, even though their CG website outlines that they aim to show how public green spaces can be alternatively used, and also to 'create a strong sense of community for UM' (MUC, N.D). This suggests that their garden space already aligns with their vision. Not only could strategically envisioning their CG establishes the opportunity for students and staff to connect with those outside of their discipline in a way that creates a shared sense of place and fosters a healthy campus but provide outdoor opportunities for engaging in scientific education (Krasny & Tidball, 2009) as well as the arts, social sciences and geography (Marsh et al., 2020). UM's garden is well positioned to be envisioned as an outdoor learning space as it is funded by the Environment Department (MUC, N.D).

Both USC and JCU envision a 'campus heart' or a space where students and others feel socially, physically, and mentally safe/represented, thus building social

connections on campus. JCU specifically envisions its campus heart as a space that represents and solidifies its 'tropical' identity.

The built design for the USC campus keeps the campus heart at the centre of major learning buildings so that it is a place of constant foot traffic and social engagement; where students and staff feel they belong. USC also understand the value of representing their local environment and folds this into the identity of the campus by landscaping with various indigenous (coastal and subtropical) plant species – ensuring the Sunshine Coast is represented as its 'home' (University of the Sunshine Coast, 2020b).

Table 8.3 Sample goals reflecting community building with the broader community

University	Goal
ANU	Create a campus where activities are integrated into the nation's capital (i.e. the surrounding community) (p. 5)
JCU	Create a sense of belonging for its students, staff and the community members (p. 48)

LTU	Invite the community onto the campus to optimise the use of shared facilities and help to generate day/night activation and vibrancy (p. 86)
UC	Engage and connect with the surrounding neighbourhoods, the Belconnen Town Centre and Lake Ginninderra Create an enjoyable public domain that can be used by the university and the community
USC	The University of the Sunshine Coast seeks to become a focus of the regional community through enabling a broad spectrum of the population to access its programs, facilities, and places of interest, extending a positive educational, cultural and economic influence beyond its immediate academic community (p. 9)
UM	Build on the existing cultural facilities through the development of adjoining cafes and social spaces along with the introduction of impromptu spaces to enliven the edges of the Centre precinct, blur the boundary between campus and city and enhance its engagement with the city (p. 52)

While campus hearts are great design tools for building representation, sometimes students need quieter spaces where they also feel represented (Lau et al., 2014). For example, JCU's current CG is nestled at the base of tropical rainforest and strongly enhances the tropical palette they are building their identity on. Their gardening group outline on social media that the garden is a quiet space where students can sit and socialise (James Cook University Community Garden, 2022), or garden at their 'leisure' (James Cook University, 2018), whilst engaging with the tropical environment. USC's garden was established as a place of both education and engagement and incorporates local Indigenous bush tucker foods (The Moving Feast, 2022). Their garden reinforces the palette of local native flora USC uses to establish their landscape and university identity. We thus pose that, perhaps, green spaces such as gardens, could be further considered in campus design as landscaping tools to engage students on campus, reinforce campus identity, and complementary design elements such as campus hearts.

Designing a campus to increase the sense of place and community can also play an important role in connecting universities to their surrounding neighbourhoods (Brennan & Cochran, 2019). Masterplans envision this civic engagement with the broader community, and CGs can meaningfully contribute to achieving these goals.

For example, UM envisions its future campus as being blurred, enlivened part of the surrounding city. Urban campuses, such as UM, can be cultural and community hubs for their surrounding neighbourhoods by forming part of the urban fabric. They bring vibrancy to the area and provide spaces where the community can engage and interact (Brennan & Cochran, 2019). But how can CGs complement the goals oriented towards community development?

The benefit of using CGs within urban settings is that they provide a place where individuals can actively shape and build their representation within the community. By digging soil, choosing plants, or tending to the land, those who participate in gardens are becoming 'soil' citizens, who establish a strong sense of identity with both place and each other (Baker, 2004). Encouraging the use of gardens as tools for developing community is thus one avenue worth exploring. Their use has been suggested to encourage the surrounding neighbourhoods to engage with the university on a deeper level (Marsh et al., 2020). Gardening clubs such as UM's (MUC, N.D), UC's (University of Canberra Signpost, 2022), and JCU's (James Cook University, 2018), recognise this and readily welcome community members to participate in their gardens. We see community building with the broader community as an emergent theme in the case study master plans. As can be seen in Table 3, community building is something envisioned by all case studies, with

ANU outlining a plan to "create a campus where activities are integrated into the

nation's capital (i.e. the surrounding community)."

UC aims to create an enjoyable public domain for both their campus and surrounding communities, LTU outlines how they invite the community onto their campus to contribute to both their day and night-time vibrancy, and UM plans to blur their boundaries, enhancing engagement with the city through social spaces. Utilising the campus CGs could help blur the physical and social boundaries between on and off-campus communities and create a larger sense of neighbourhood citizenship. UC's CG is conveniently located next to their central hub and is advertised as a space for locals, staff, and students (University of Canberra Signpost, 2022), which could help entice broader community members to engage on campus. Their garden actively enables them to achieve their goal of 'creating a public domain that engages with the broader community'. The garden club at UM also readily encourages locals to join their space (MUC, N.D). Marsh et al. (2020), however, outlines that unless the visible activity is occurring in the garden, community members are likely to not engage as universities are seen as private, exclusive spaces. LTU fuels this narrative by excluding community members from their CG and only opening it to the staff and students (The Patch, 2021). This action directly contradicts their vision of being the 'campus for the community'. By opening their garden to the surrounding community they would be helping to achieve their vision identity.

Suburban universities are keystone institutions that can lessen the isolation of suburban areas (Fernandez-Esquinas & Pinto, 2014). Both JCU and USC seeks to foster engagement with the surrounding community in accessible ways, and their gardens could assist in achieving these goals due to their socially inclusive nature. USC recognise the difficulty of being a suburban campus and has established itself as a key connection in the public transport system on the Sunshine Coast. Having such an accessible campus allows them to become a hub of social interaction, but providing accessible spaces on campus where the community can engage is important if they wish for community members to 'hop off the bus'. While cafes are present on both JCU and USC's campuses and are great places for engagement, CGs are uniquely recognised as financially accessible spaces, with little cost needed to participate (Egli, Oliver, & Tautolo, 2016). JCU's garden, however, is tucked up at the back of the campus, which makes engaging students – let alone the community – challenging. As highlighted above, CGs need to be legible on campus, which means proper positioning and signposting, in order to be successful ventures.

If correctly advertised, promoted, and positioned, CGs can act as accessible spaces for the broader community to engage with campus life in their own meaningful way

and help these suburban universities become the social hubs that suburban locations need.

In sum, while the goals outlined in Table 3 demonstrate that universities are willing to engage with their surrounding neighbourhoods, the masterplans themselves fall short of recognising gardens as a viable planning tool. In failing to recognise and promote these green spaces as social places, campus CGs lose their potential as sites of civic engagement. As semi-public spaces, when signposted correctly and readily used, they can blur the social and physical boundaries between campus and the wider community. This is particularly important for the transient environment of universities which require long-term active participation to keep gardens thriving (Laycock Pedersen, 2020). The ethos of CG literature and the goals of the campus masterplans are aligned, however, and more formally incorporating gardens into strategic visions would ensure they become long-term and successful spaces that benefit the university.

Conclusion

This paper advocates CGs as valuable planning tools that could be more strategically considered by universities as spaces of civic engagement and place-making. Given the presence of gardens on many Australian university campuses

and their multiple tangible benefits, we expected them to be more visible in campus masterplans. CGs are social and environmental spaces that provide opportunities for collaboration and socialising and increase student wellbeing yet remain relatively invisible in campus masterplans. While the ethos of gardens outlined in the literature aligns with various civic engagement and planning goals of universities, they remain under-recognised in the strategic planning space.

CGs can enhance the sense of place and community-building goals of campus masterplans in a number of ways. They are comforting environments that provide opportunities for expansive but safe community-based social interaction (Cumbers et al., 2018; Kingsley et al., 2009). A vision of safe, friendly spaces for interaction is evident in both ANU and LTU's masterplans, and a desire for a collaborative, interactive university community is prioritised by ANU and JCU. The inclusion of the CGs within JCU, USC and LTU's masterplans suggests an awareness of their potential; including the garden on a map, as JCU has, also helps ensure the visibility of the garden as an important infrastructure. Not only do gardens support goals within the masterplans, but their presence and active use on-campus can create physical, mental and emotional benefits for the university community, while also engaging the broader community and solidifying the university's social role within the neighbourhood.

In a highly competitive tertiary education market, universities now set themselves apart by creating a campus brand or identity. The emergence of campus masterplans over the past decade is a testament to this, and we think incorporating CGs into masterplans could enhance their social and environmental goals. CGs are alternative green leisure spaces that help establish a sense of place and community. Enlisting them as tools to do so is as simple as signposting their existence and including them on maps and plans (Kingsley et al., 2009; Laycock Pedersen, 2020). Keeping them in sight during strategic planning exercises helps envision the future of the campus.

Post-COVID, CGs have the potential to help re-establish student life, enjoyment, and overall retention; a must if Australian universities wish to recover economically and socially from the pandemic. Fostering healthy and engaged student life on campus is imperative for the future of Australian universities now with the need to navigate the task of fostering a new sense of campus life.

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