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3. Abstract

This dissertation examines the impact of workshops about antique seeds, natural farming, and seed balls as agents of change for individuals' connections to nature. The research investigates whether these workshops, using a combination of theoretical and practical teaching methods, can enhance participants' understanding of environmental protection and encourage them to take action. Specifically, the research examines whether this interaction can shift individuals' perspectives from a human-centered view to a more ecologically conscious perspective. Additionally, the study seeks to explore any changes in participants' awareness and behaviour towards climate action. The research employs both quantitative and qualitative data to demonstrate the effectiveness of the teaching methods used in facilitating comprehension, inspiring participants, cultivating a sense of responsibility, and promoting observation. However, the findings also indicate that while these workshops can increase awareness, they alone are not sufficient to induce behavioural change or instill confidence and responsibility in individuals to engage in climate action.

Keywords: ecological consciousness, nature connection, ecocentric, anthropocentric, antique seeds, natural farming, seedball, workshop, transdisciplinary education, phenomenological experience, behaviour change, sustainability, climate change, climate action, awareness, interdisciplinary education, sustainable development goals, practical and theoretical teaching methods, responsible learning, outdoor learning, indoor learning, hands-on learning.

4. Introduction

This dissertation is based on two workshops about 'Ancient Seeds, Natural Farming, and Seedballs,' which were collaboratively developed by myself, the founder of Empower with Nature, and Mine Küçük, an archaeologist and museologist, provided as workshop of Empower with Nature, an NGO dedicated to climate action through transdisciplinary education and projects. The workshop was specifically designed for the audience of the Kalyon Cultural Center, located in downtown Istanbul and known for its distinctive focus on

environmental and digital art exhibitions. Empower with Nature, aims to deliver impactful and engaging sessions to the attendees of the cultural center. There were two workshops conducted on 25 October, 2022 and 14 December 2022, with a total of twenty-five attendees from diverse backgrounds, including teachers, archaeologists, journalists, art lovers, and individuals seeking knowledge about seeds. These participants were all residents of Istanbul.

The present dissertation addresses the potential impact of attending workshops focused on antique seeds, natural farming, and offering hands-on activities involving seedball production and the phenomenological experience of observing the growth of the seedballs and growing plants on individuals' ecological consciousness. This research aims to investigate whether workshops like these influence participants' connection with nature and, in the long term, whether they can affect change in awareness and behaviour, leading the workshop participants to adopt more environmentally sensitive approaches to nature.

The primary objective of this research is to explore and understand the impact of a workshop on individuals' profound connections with nature. As Shree Deepa explains, '[t]he idea behind the term 'seed ball' is Japanese in its origin and is agricultural in its discipline'.[1]The seeds are encased in a layer of clay, soil, and water to produce seedballs. Clay is durable and resistant to numerous environmental conditions. When dispersed across the ground and exposed to rain or inundation, the outer layer of muddy clay becomes saturated, allowing the seeds within to germinate and sprout. This innovative method of seed dispersal increases survival rates and promotes regeneration in a wide range of ecosystems. Inspired by Masanobu Fukuoka, who is a Japanese farmer, biologist, and philosopher, the seedballs are conceptualised as 'a small universe in themselves.'[2] Through the workshop, individuals will have the opportunity to immerse themselves in the process of creating seed balls, which symbolise the potential for new life. This tactile experience fosters a sense of connection and respect for nature as they witness the transformation of their actions into tangible, living beings. By understanding the role of seedballs in rewilding landscapes, individuals can gain a deeper appreciation for the interconnectedness of all living beings and the impact their actions can have on the environment. As Tim Ingold has cogently noted, 'we owe our very being to the world we seek to know. In a nutshell, participant observation is a

[1] Shree Deepa, 'Thought Seeds in Anthrogogic Learning Contexts', (2023), p.4. https://www.researchgate.net/publication/369595477_Thought_Seeds_in_Anthrogogic_Learning_Contexts [accessed 15 August 2023].
[2] Masanobu Fukuoka, *The One-Straw Revolution: An Introduction to Natural Farming,* (New York: Review of Books, 2010), p.10.

way of knowing from the inside'.[3] Participant observation, in this case through observing and growing seedballs, is a means of gaining a deeper understanding from within. This research explores whether this connection with nature can be achieved through the process of observing and growing seedballs.

Furthermore, this knowledge can inform the development of future workshops and educational programmes that aim to foster sustainable practises and attitudes. By identifying the specific factors that lead to positive changes in ecological consciousness, we can create more targeted interventions that have a greater impact on individuals and communities. Ultimately, this research can help drive progress towards a more sustainable and environmentally conscious society. Jack Hunter explains that '[a]n ecological perspective on consciousness would see consciousness – just like any other element of an ecosystem – as being connected to all other elements of the system through various modes of interaction and relationship'.[4] This research investigates whether the act of growing seedballs can help participants go beyond simply feeling connected to nature.

By examining the impact of this workshop on participants' ecological consciousness, we can gain insights into the effectiveness of interdisciplinary teaching methods in promoting environmentally sensitive behaviour. Additionally, understanding how individuals' awareness and behaviour are influenced by these workshops can contribute to the broader goal of achieving the UN Sustainable Development Goals. Through this workshop, we are mainly focusing on Sustainable Development Goal 13: Climate Action. Climate action is a critical aspect of sustainable development as it aims to combat climate change and its impacts. By targeting this specific goal, the workshop can help participants understand the urgency and importance of taking action to mitigate climate change. Furthermore, by promoting environmentally sensitive behaviour through interdisciplinary teaching methods, the workshop can empower individuals to become active agents in addressing climate change and contributing to a more sustainable future.

The research focuses on exploring the transdisciplinary nature of the workshop. The United Nations' decade of education for sustainable development agenda states regarding this need that '[n]o one discipline can claim education for sustainable development on its own,

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[3] Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture,* (Oxon: Routledge, 2013), p.5.

[4] Jack Hunter, 'Gothic Psychology the Ecological Unconscious and the Reenchantment of Nature'. *Gothic Nature Journal Blog*, (2020), 1-18, (p.7). https://www.academia.edu/42345647/Gothic_Psychology_The_Ecological_Unconscious_and_the_Re_Enchantment_of_Nature?auto=download&email_work_card=download-paper [accessed 12 July 2023].

but all disciplines can contribute.'[5] Consequently, the purpose of this study is to determine whether a change in behaviour and awareness of information, historical learning, and experiential learning are possible by adding hands-on activity to the imparting of information. While extensive research has been conducted on education, sustainability, climate action, behaviour change, and awareness increase, there remains a notable gap in the literature when it comes to the integration of transdisciplinary education and hands-on and experiential methods in classroom teaching. This lack of attention to combining theoretical knowledge with participant engagement and observation hinders our understanding of how these approaches impact behaviour and awareness related to sustainability and climate change.

In-depth interviews were employed to discover whether there are any changes in workshop attendees' ecological consciousness, focusing on changes in ecocentric views. Freya Harrild and David Luke explain ecological consciousness thus,

> The symbolic persona of Gaia is said to be integrated into our consciousness and emanates the voice of the Earth through our own ego identity, supporting the idea of an ecological ego that connects the consciousness of the entire species and inherently links us to the Earth.[6]

This research aims to discover whether the type of increased ecocentric view put forth by Harrild and Luke can be achieved through a workshop project process.

The research uses mixed research methods. Data was collected through questionnaires and interviews, using both qualitative and quantitative methods. Additionally, incorporating insider and outsider methods of reflexivity allows for a more nuanced analysis by considering both the perspectives of those directly involved in the teaching methods and those observing from an external standpoint.

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[5] United Nations Educational, Scientific and Cultural Organisation *United Nations Decade Of Education For Sustainable Development (2005-2014): International implementation scheme. Paris*, (2005). p.31. http://unesdoc.unesco.org/images/0014/001486/148654E.pdf [accessed 02 August 2023].

[6] Freya Harrild and David Luke, 'An Evaluation Of The Role Of Mystical Experiences In Transpersonal Ecopsychology', ResearchGate, 5 (2020), pp.1-15 , (p.6) https://www.researchgate.net/publication/341453879_An_evaluation_of_the_role_of_mystical_experiences_in_transpersonal_ecopsycholgy. [accessed 24 March 2023].

Overall, this research aims to explore the potential effects of incorporating theoretical and practical learning techniques, as well as transdisciplinary learning, on individuals' connection with nature and their ability to adopt an ecocentric perspective. It also seeks to assess whether these changes in attitude have any tangible impact on behaviour and contribute towards achieving Sustainable Development Goals, such as promoting environmental conservation and sustainable practices. This research aims to provide valuable insights for educators, researchers, and practitioners in designing effective interventions that foster a more ecologically conscious society. Ultimately, the findings could contribute to the development of strategies that encourage individuals to prioritise environmental stewardship and make informed decisions that support long-term ecological sustainability.

5. Background of the Workshop Content

The workshop began with an indoor PowerPoint presentation on how people have sustained themselves for food security from ancient times to today. It explored the relationship between humans and land, agricultural evolution, and modern farming practices. The presentation commenced with information about people who gathered and hunted food from the Pleistocene to the Holocene. As Sally Binford mentions,

> [u]npredictable changes in climate at the end of the ice age, reductions in the number of big game preferred by hunters, and occupation of suitable habitats by humans caused changes in hunting-gathering behaviour.[7]

This climate change forced people to select lands to start domesticating plants and animals. As mentioned by Hüseyin Çiftçi, during the Neolithic period, significant changes occurred in 'domesticating plants and animals and starting agricultural activities. This is referred to as the agricultural revolution or the Neolithic revolution.'[8] The presentation also described the varieties of food and recipes that were created using these ancient seeds. This concise account of archaeology and history describes the hunter-gatherer era and how people lived during that period.

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[7] Sally R. Binford, Lewis R. Binford, *New Perspectives in Archeology*, (Chicago: Aldine Pub. Co,1968), p. 313.
[8] Hüseyin Çiftçi, *Tarımın Tarihi* (*History Of Agriculture*) (2016),pp1-36 (pp.1-2). https://www.researchgate.net/publication/311795149_TARIMIN_TARIHI_HISTORY_OF_AGRICULTURE [accessed 07 April 2023]. en önemlisi avcı ve toplayıcı insanın bitkileri ve hayvanları evcileştirip zirai faliyetebaşlayarak yiyecek üremesidir. Bu tarımsal devrim ya da neolitik devrim olrak ifede edilmektedir. (author's translation).

The presentation also provided a brief summary of permaculture, natural farming, Indigenous traditional ecological knowledge, and regenerative agriculture as alternatives to industrial agriculture and the use of pesticides in agriculture for food security and ecological restoration. The presentation pointed out the importance of regenerative and natural farming techniques in modern agriculture, highlighting the link between ancestral knowledge, soil degradation, and the domestication of seeds and animals. Regenerative agriculture, as Christopher Rhodes explains, 'has at its core the intention to improve the health of soil or to restore highly degraded soil, which symbiotically enhances the quality of water, vegetation, and land-productivity.'[9] Natural farming is explained by Masanobu Fukuoka, thus,

> [i]nstead of the modern approach of applying increasingly complex techniques to reshape nature for the benefit of humans, agriculture is practiced as simply as possible within and in collaboration with a natural environment.[10]

There is a connection between the way Fukuoka farms and the way farming was conducted prior to the domestication of plants. Therefore, it is a wonderful example of how sometimes it is necessary to learn from the past in order to adopt healthier, less labor-intensive, simpler natural alternatives.

The presentation continued with an explanation of what seed balls are and why we are making them. Robert Biel explains Masanobu Fukuoka's seed-balls thus 'you toss randomly a variety of different seeds enrobed in clay and allow nature to choose where they are best suited to grow – as 'seed-bombs.'[11] To construct seed balls, it is necessary to know which seeds can be used together and support one another's growth, as well as which seeds are ideal for the climate and season.

The participants gathered around a table to create their seedballs, made from the preparation of seasonal seedlings for the Istanbul region, with their own hands. The workshop involved participants planting seed balls, providing a profound phenomenological experience. They learned about the relationship between nature and vegetation life cycles through observation of sunlight and wind. Sharing photos with Kalyon Cultural Centre and Empower

[9] Christopher J. Rhodes, 'The Imperative for Regenerative Agriculture'*, Science Progress* (2017), 100(1), pp.80–129*, (p.80), Paper 1700224* doi:10.3184/003685017X14876775256165 [accessed 28 March 2023].
[10] Fukuoka, *The One-Straw Revolution*, p.42.
[11] Robert Biel, *Sustainable Food Systems: The Role of the City*, (London: UCL Press: 2016), p.113. *JSTOR*, https://doi.org/10.2307/j.ctt1j1vzc5.15. [accessed 3 Dec. 2022].

with Nature Instagram accounts allowed participants to connect with a community and motivate each other to care for their seedballs.

6. Literature review

6.1. Exploring the Link Between Ecological Consciousness and Changes in Awareness and Behaviour

Alexander Spirkin suggests that in order to understand the intricate connection between ecological consciousness and changes in awareness and behaviour, he states,

> Consciousness is the highest level of the brain that is unique to humans and associated with speech, it is a generalising, evaluative, and purposeful reflection of reality in the pre-mental construction and anticipation of behavior, and constructive creativity consists of changing their results, rational regulation of behavior, personality and self control.[12]

As Spirkin mentions, an ecologically conscious person or environmentalist engages in pro-environmental behaviours and has the values and attitudes associated with these behaviours. Rupert Sheldrake explains consciousness thus, 'memory (and/or consciousness) is more accurately described as a field state whose properties operate according to the mechanics of resonance'.[13] Hence, the workshop endeavours to establish a resonant connection, highlighting the immense significance of natural farming and cultivating seeds. Arne Naess, founder of the Deep Ecology philosophy and movement, explains the ecological self as 'the ecological self of a person is that with which this person identifies'.[14] In this context, ecologically conscious people may strive to align their actions and choices with the harmonious resonance of the natural world, recognising their interconnectedness with

[12] Alexander Spirkin, *Fundamentals of Philosophy*. Trans. by Sergei Syrovatkin. (Moscow: Progress Publishers, 1990). p.99.
[13] Rupert Sheldrake, *Science Set Free:10 Paths to New Discovery*, (New York: Deepak Chopra Books, 2012) p. 199.

[14] Arne Naess, Alan Drengson and Bill Devall (eds), *Ecology of Wisdom*, (Penguin Books Ltd. Kindle Edition), p.229.

it. Also, as scholars like Fukuoka[15], Ingold[16], Hunter[17], Harild and Luke[18], mentioned in the introduction section, through connection, identification, and learning intrinsically through phenomenological experience, a connection with nature can be forged. David Joseph Bohm explains,

> The archetypal form is projected from this state of potentiality into matter that then is imbued with experiential knowledge of the material world, and then subsequently enfolded back into the domain of forms, and then re-projected.[19]

As Bohm suggested, a person's potential to change behaviour increases after knowledge creates an understanding, and then they can reproject what they have learned. This dissertation examines whether participating in the workshop, learning about their seeds, and phenomenologically observing their seeds grow enables the participants to achieve the state of transformation.

Nature interaction fosters ecocentrism, environmental ethics, and connection. As Curry states about the theory of the ecocentric view, it is 'concerned with nonhuman nature as well as humans'.[20] Ecocentrism emphasises aligning actions with nature's principles, acknowledging interconnectedness, and fostering personal ecological identity through mindful observation, developing nature's connection to humans. By instilling a sense of care and responsibility towards their seedballs, participants gained a perspective that embraces nature's viewpoint. Stephan Jay Gould has observed that,

> We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well - for we will not fight to save what we do not love.'[21]

The objective was to investigate whether this immersive experience could effectively transform behaviour and attitudes towards environmental consciousness.

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[15] Fukuoka, *The One-Straw Revolution*, p.10.
[16] Ingold, *Making: Anthropology*, p.5.

[17] Hunter, Gothic Psychology, p.7.
[18] Harrild and Luke, Transpersonal Ecopsychology, p.6.
[19] David Bohm, 'The Implicate Order: The Holodynamic Model of the Universe'. *Science and Mysticism: Exploring the New Realities Conference (Cambridge, MA:*Harvard Science Center, Harvard University,1984) [Published in David Bohem, *Unfolding Meaning: A Weekend of Dialogue* , (London and New York: Routledge, 1985) pp.1-25.
[20] Patrick Curry, *Ecological Ethics An Introduction*, 2nd ed. (Cambridge: Polity Press, 2011) p. 4.
[21] Stephan Jay Gould, *The Book of Life: An Illustrated History of the Evolution of Life on Earth* 2nd Ed, (New York: WW Norton Company, 2001.) p.40.

6.2. Ecological Consciousness and Connecting History to the Present: Theoretical Learning

The theoretical instruction emphasised transdisciplinary education by combining archaeology and ecology. As Sheldrake states, '[w]e are connected to the past by memory and habit and to the future by desires, plans, and intentions.'[22] The presentation bridged the gap between historical and contemporary theoretical knowledge. By understanding the historical context and theories, individuals' insight into how past actions have shaped the present was facilitated. Fulvio Mazzochi explains,

> from direct observations over millennia, generally transmitted orally between generations in cultures from around the world, different views of nature have been developed, embodying a wealth of wisdom and experience.[23]

Mazzochi's statement shows that through observation, valuable insights into sustainable practises and the importance of preserving biodiversity for future generations can be gained.

The research bridged ancient and traditional knowledge with modern agriculture and food security issues, as well as recognising how ancient knowledge influences modern problems and their solutions. Ecopsychologist Ralph Metzner explains that people with ancient consciousness 'believed that Earth is not only alive, it is also a conscious being with whom one can communicate in altered states of consciousness, such as divination'.[24] Therefore, the ancient people who lived in nature possessed environmental awareness by viewing nature as sentient and viewing things from an ecocentric perspective. This approach to environmentalism is distinct from the contemporary worldview, which views nature as a resource to be exploited for human gain. Traditional ecological knowledge of Indigenous cultures can result in more sustainable and effective solutions. Metzner also mentions that '[t]he globe has increasingly come to the realization that indigenous societies provide models for the kind of sustainable stewardship of natural resources that the industrial world

[22] Rupert Sheldrake, *Science Set Free:10 Paths to New Discovery*, (New York: Deepak Chopra Books, 2012) p. 226.
[23] Fulvio Mazzocchi, 'Western Science and Traditional Knowledge: Despite Their Variations, Different Forms of Knowledge Can Learn From Each Other', *EMBO Reports*, 7 (2006), p. 463.
[24] Ralph Metzner, *Green Psychology Transforming Our Relationship to the Earth,* (Vermont: Park Street Press, 1999), p.33.

desperately needs to learn.'[25] This research is important as it can shed light on the effectiveness of workshops in promoting sustainable practises and climate action among participants and also ask whether such initiatives can lead to long-term behavioural changes.

As Elena Luppi mentions, to deal with the complexity of sustainable development, teaching modules were organised into learning objectives such as 'the history of sustainable development and ecological, economic and social implications of sustainability.'[26] Therefore, this research examines the interplay between ecology, archaeology, and the fascinating journey of seeds, shedding light on the dynamic interaction between humans and nature. This research emphasises the growing recognition of indigenous societies as models for sustainable resource stewardship.

6.3. Ecological Consciousness: Hands-on and Experiential Learning

As Patrick Curry argues, 'understanding and practice are never radically separate anyway; 'theory' is itself just another kind of practise.'[27] This perspective emphasises that ecological awareness is not limited to passive learning but also includes active engagement and personal reflection. Curry's viewpoint underscores the significance of hands-on experience and practical application in developing a deep understanding of ecological ethics. In other words, theory alone is not enough; it is through experiential learning and personal reflection together that individuals can truly cultivate ecological awareness.

Numerous examples from all over the world show how effective seedballs are at reducing climate change. C. Tamilarasan et al. also state in their research that the 'seedball technique is recommended for forest regeneration and re greening the earth surface.'[28] Throughout the world, mainly in response to forest fires, seed balls are starting to be used as a climate action tool. According to the research of Nwankwo, C.I., et al.,'Seed-balling, seed-bombing or aerial reforestation is a technology currently used for ecological restoration in semi-arid subtropical regions.'[29] During forest fires in Turkey, a company called Ecording used "drown" technology to toss seed balls into the forests. As the Ecording company

[25] Metzner, *Green Psychology,* p.10.
[26] Elena Luppi, 'Training to Education for Sustainable Development Through E-Learning'. *Procedia Social and Behavioural Sciences*, 15, (2011) pp. 3244-3251, (p.3248). http://dx.doi.org/10.1016/j.sbspro.2011.04.279. [accessed 24 May 2023].
[27] Curry, *Ecological Ethics*, p. 14.
[28] C. Tamilarasan, Jerlin Regis and Komal Raja. 'Seed Ball Technique For Enhancing The Establishment Of Subabul (Leucaena Leucocephala) Under Varied Habitats'. *Journal of Tropical Forest Science*. No.33, (2021) pp.270-276. (p.270), 10.26525/jtfs2021.33.3.270. [accesed 1 May 2023].
[29] Charles Ikenna.Nwankwo, 'Physical and Chemical Optimisation of The Seedball Technology Addressing Pearl Millet Under Sahelian Conditions' *Journal of Agriculture and Rural Development in the Tropics and Subtropics* (2019), Vol.119, pp. 67-79. (p.68), https://doi.org/10.17170/kobra-2019011596 [accessed 1 May 2023].

website explains, 'EcoDrones are unmanned aerial vehicles that support forestation and biodiversity studies by shooting seeds and seed balls in hard-to-reach areas in the fight against the global climate crisis.'[30] According to the 'Atlas of theFuture' website in Thailand, during the forest fires in April 2013 'the Royal Thai Air Force dropped seed bombs over a wildlife sanctuary the size of 800 football fields in Phitsanulok province.'[31] Therefore, seed ball usage by governments, researchers, and eco-tech companies plays a part in the Sustainable Development Goals and the quicker recovery of nature.

Ann Dale and Lenore Newman's study states that "the hands-on problem" based learning required of sustainable development education, as well as the transdisciplinary approach needed to familiarise students with the complexities of sustainable development'.[32] This hands-on workshop allows participants to actively engage in the learning process and gain practical skills for sustainable development.

6.4. Responsible Learning and Outdoor Phenomenological Experience

Daniel Blumstein and Charlie Saylan discuss the research observing environmental education's failures in personal responsibility in education for sustainable development (ESD) '[t]here have been calls to re-evaluate ESD efforts due to the disconnect between environmental education and personal responsibility.'[33] Consequently, this is a modest incentive for participants to exercise personal responsibility and gain experience when caring for their seeds. Julia Shaw's research proves that,

> Learning that activates as many senses as possible (seeing, smelling, touching, hearing, moving, ...), which takes place in a dynamic, real-world learning environment, and which demands social interaction and self-guided involvement of the learners, is likely to be very effective.[34]

[30] Ecording, (2017) https://ecording.org/en/ecodrone/ [accessed 10 October 2022].
[31] Atlas of the Future, (2017) https://atlasofthefuture.org/project/aerial-reforestation-in-thailand/ [accessed 10 October 2022].
[32] Ann Dale and Lenore Newman, 'Sustainable Development, Education and Literacy', *International Journal of Sustainability in Higher Education*, Vol. 6 No. 4, (2005) pp. 351-362, (p. 358). .http://dx.doi.org/10.1108/14676370510623847. [accessed 12 May 2023].
[33] Daniel T Blumstein and Charlie Saylan, *The Failure of Environmental Education (And How We Can Fix It),* 1st. ed. (Berkley, Los Angeles, London: University of California press, 2011),.p.95. JSTOR, http://www.jstor.org/stable/10.1525/j.ctt1pnv79. [accessed 14 May 2023].
[34] Julia Shaw, *The Memory Illusion Remembering Forgetting and the Science of False Memory,* (London: Random House Books,2016), pp.251-252.

Therefore, by engaging in immersive nature experiences, participants can enhance their learning and reach their maximum potential through sensory engagement, hands-on exploration, and observations of seed growth.

Observing and revisiting the seed balls transforms the learning experience into a phenomenological one. As Immanuel Kant states about the phenomenological experience of the environment, 'we can never experience it directly, always mediated by the senses, cognitive categories, etc.' [35] Participants can connect experiential learning to nature by tossing their seed balls and checking on them. Another study about experiential learning theory (ELT) from Nathália Rigui Trindade et al.'s research suggests that,

> …by adopting the ELT as a background to develop the initiative, it is possible to achieve the outcomes expected from the education for sustainability, especially encouraging reflections to change behaviours, increasing knowledge, and developing competencies for sustainability.[36]

This approach empowers individuals not only to acquire knowledge but also to actively implement it in their day-to-day activities. Curry explains, '[o]bservation is always a kind of intervention. To pretend otherwise simply amounts to trying to avoid acknowledging and taking responsibility for one's own perspective.'[37] Consequently, we must acknowledge and take responsibility for our biases. By being aware of our perspectives, we can better understand how they shape our approach to environmental responsibility.

Phenomenological sensing and ecological consciousness are explained by David Bohm's concept of phenomenological-sensorimotor events as, 'matter projected from the whole that has passed the minimum threshold to affect our human sense perception.'[38] The idea of the research is to see if participants can increase their ecological awareness and understanding of nature through their experiences observing, planting, handling, and even smelling plants, which help us perceive the whole that affects our senses. Phenomenological perception can help us appreciate nature and our place in it. As Mark Schroll mentions,

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[35] Immanuel Kant, *Theoretical Philosophy*, trans. and ed. by David Walford (Cambridge: Cambridge University Press, 1992 [1755–1770]), p. 237.
[36] Nathália Rigui Trindade, etc.al. 'The Construction of Interventions Based on Experiential Learning To Promote Education For Sustainability In Management Teaching'*, Cadernos EBAPE. BR 20*, (2022) pp.90-104. (p.90).
[37] Curry, *Ecological Ethics,* p. 13.
[38] David Bohm, 'The implicate order: The holodynamic model of the universe'. *Science and Mysticism: Exploring the New Realities Conference (Cambridge, MA:* Harvard Science Center, Harvard University,1984) [Published in David Bohem, *Unfolding Meaning: A Weekend of Dialogue*, (London and New York: Routledge, 1985) pp.1-25.

> The archetypal form is projected from this state of potentiality into matter that then is imbued with experiential knowledge of the material world, and then subsequently enfolded back into the domain of forms, and then re-projected.[39]

This process of projection and enfolding back into the domain of forms is a continuous cycle that allows for the evolution and development of both experience and consciousness. Through experiential knowledge of the material world's processes, we can expand our understanding of and connection to the world around us.

6.5. Transdisciplinary Learning and Ecological Consciousness

Charles Button defines transdisciplinary education as follows: 'the prefix 'trans' indicates transdisciplinary concerns that are at once between the disciplines, across the different disciplines, and beyond all disciplines.'[40] The disciplines used for this research go beyond ecological and archaeological perspectives and delve into agriculture as a manifestation of human nature, an analysis of historical contexts, and an examination of current issues and solutions. According to Button, '[t]ransdisciplinary entails both a new vision and a lived experience.'[41] Similar to Button's view, Soren Brier adds,

> [t]he modern evolutionary paradigm combined with phenomenology forces us to view human consciousness as a product of evolution as well as accept humans as observers from the 'inside of the universe.[42]

The research utilises the connection between archaeology and ecology to give a new vision of seeing things in a full cycle of time, using the growth of seedballs as a means to

[39] Schroll, *Transpersonal Ecosophy* p. 50.
[40] Barbara Clark, and Charles Button 'Sustainability Transdisciplinary Education Model: Interface of Arts, and (STEM) Community', *International Journal of Sustainability in Higher Education 12 No*. 1, (2011) pp.41-54. p..(42), doi.10.1108/14676371111098294. [accessed 14 May 2023].
[41] Clark, and Button 'Sustainability Transdisciplinary Education Model, p.53.
[42] Soren Brier, 'Cybersemiotics: A New Foundation for a Transdisciplinary Theory of Consciousness, Cognition, Meaning and Communication'. In: Swan, L. (eds) Origins of Mind*. Biosemiotics*, vol 8.(2013) pp.97-126. (p.97) Springer, Dordrecht. https://doi.org/10.1007/978-94-007-5419-5_5.

establish a connection between individuals and nature while exploring the potential relationship between consciousness and phenomenology.

To achieve the 2030 Sustainable Development Goals, education regarding sustainable development, climate action, and nature connection has increased. The research shows that scholars such as Luppi[43], Dale and Newman[44], Eagan et al.[45], mention in their research the need for adopting an interdisciplinary approach to sustainable development education.

7. Methodology

7.1. Ancient Seeds, Natural Farming, and Seedball Workshop Content Methodology

The collaborative workshop, "Ancient Seeds, Natural Farming, and Seedballs," provided a comprehensive understanding of both historical and contemporary perspectives, using a varied and holistic approach incorporating diverse teaching methods. The workshop adopted a methodology based on David and Alice Kolb's [46] learning cycles, specifically the "Why?" "What?" "How?" and "What if?" quadrants,which themselves provided a comprehensive framework throughout the session. The historical aspect of seeds and farming addressed the "Why?" question by examining the sustainability of ancient farming practises. The "What?" section focused on the definition of "natural farming" and explored the various techniques used in modern times. Transitioning to the "How?" phase, participants engaged in the preparation of seed balls, translating knowledge into a hands-on activity. Finally, the "What if?" stage occurred after the workshop, placing the responsibility on participants to plant, water, and observe their seed balls. This stage facilitated experiential learning through phenemelogical experience by observing and moving beyond the theoretical and hands-on aspects of the indoor workshop to outdoor exploration.

For the purpose of the workshop's subject matter, library-based research was carried out on topics such as ancient seeds, neolithic times, the agricultural revolution, traditional

[43] Luppi, Training to Education for Sustainable Development, p. 3248.
[44] Dale and Newman, 'Sustainable Development, Education and Literacy', p. 358.

[45] Patric Eagan, Tanya Cook and Erhard Joeres, 'Teaching The Importance Of Culture And Interdisciplinary Education For Sustainable Development', *International Journal of Sustainability in Higher Education*, Vol. 3 No. 1, (2002) pp. 48-66.http://dx.doi.org/10.1108/14676370210414173. [accessed 12 May 2023].
[46] Alice. Y Kolb., & David. A. Kolb, 'Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education'. *Academy of Management Learning & Education,* 4(2), (2005). pp.193-212.

ecological knowledge, an ecocentric point of view, natural farming, regenerative farming, permaculture, sustainable farming, seedballs, the usage of seedballs, and the United Nations Sustainable Development Goals.

7.2. Methodology of the Research

The information provided for the background of the presentation and the underlying theories and scholarship is acquired from library-based research. This investigation focuses on a variety of interconnected themes, including historical and theoretical teaching approaches, hands-on learning through seedball making, phenomenological and experiential education, and fostering a sense of responsibility through growing seedballs. The study draws on library-based research to gather background information and explore underlying theories related to indoors and outdoors teaching, theoretical, practical, and responsible teaching methods, and interdisciplinary and transdisciplinary teaching methods. Additionally, academic research regarding the impact of transdisciplinary and interdisciplinary education on sustainable development goals is examined. The research also delves into library-based studies concerning sustainable development goals. Additionally, library-based research informs the exploration of ecological consciousness, nature connection, and an ecocentric worldview. Lastly, knowledge acquisition, awareness-building, and behavioural change are explored through academic readings on relevant topics.

After the library-based research, a questionnaire of seventeen questions was composed. Questionnaires were sent via email as Google Forms to attendees of the Ancient Seeds, Natural Farming, and Seedball Workshops. During the workshop, attendees were asked to share their emails and mention that MA dissertation research will be conducted based on the workshop. Out of twenty-five participants, twelve responded to the questionnaires. Twenty-five participants attended the workshop, thanks to the marketing and social media campaigns of Kalyon Centre and Empower with Nature. There was no selection, and participation was limited to a maximum of fifteen individuals on a first-come, first-served basis. A questionnaire and interview-based research followed the discussion of historical learning, hands-on education, and how all of this relates to current climate action. As Judith Bell and Stephen Waters explain, ‘a mixed method of using questionnaires with interviews provides an overview via the questionnaire. However, more in-depth options via

the interviews.'[47] Hence, for the quantitative aspect of the research, data was collected from twelve workshop attendees who completed the questionnaire, serving as the quantitative sample. From this pool of respondents, four individuals were selected for in-depth qualitative interviews, thus allowing for a deeper exploration and analysis of their perspectives. The qualitative interviews were conducted through Zoom and recorded. All Zoom recordings adhered strictly to the BERA ethics guidelines and data protection. Interviews aimed to capture a more nuanced understanding and employed qualitative research methods to delve into the intricacies of the participants' experiences and perspectives. The data collected from the respondents was utilised for one-on-one, in-depth interviews.

The aim of these qualitative interviews was to gain insight and explanation into participants' behaviours and consciousness within the context of their unique experiences. The selected individuals exhibited a deeper understanding of the workshop concept and expressed enthusiasm in their questionnaire responses. The initial quantitative questionnaire sought participants who would be willing to engage in a personal interview. Two of the interviewees faced challenges growing their seedballs. This intentional later selection provided a valuable opportunity to explore the perspectives of both successful seedball growers and those who encountered difficulties, allowing for a more comprehensive understanding of the workshop's impact. The qualitative interviewee's perspectives were explored in greater depth, allowing for a more complete understanding of their thoughts and viewpoints. As highlighted by Hennik, Hutter and Bailey 'the purpose of qualitative research is to understand or explain behaviour and beliefs within the context of people's experiences'.[48] A small number of participants were enough to gain this type of understanding when working with in-depth interview tools. Each qualitative interviewee was presented with seven questions to address. The primary focus of the qualitative interview revolved around investigating the impact of different learning methods, specifically examining whether this approach influenced the participants' awareness, behaviour, consciousness, and active involvement in climate action. Moreover, the in-depth interview questionnaire aimed to assess the participants' inclination to connect with nature.

In accordance with the BERA Ethics Guidelines and the UWTSD Research Data Management Policy of Data Protection, the research adhered to strict ethical protocols. All of

[47] Judith Bell, Stephen Waters, *Doing Your Research Project: A Guide for First Time Researchers,* (Berkshire: Open University Press, 2014 [1987]), pp.212-214.
[48]Monique Hennink, Inge Hutter, and Ajay Bailey, *Qualitative Research Methods*, (London: Sage Publications, 2010), p.111.

the interviewees were well-informed about the relevant ethical guidelines and data protection policies outlined by BERA. For both quantitative and qualitative questionnaires, participants were informed that they had the right to choose which questions to answer and that they could omit any questions they did not feel comfortable responding to. Furthermore, participants were assured that their identities would remain anonymous throughout the research process. To ensure compliance with ethical standards, each participant received an ethics protocol form to review and sign prior to answering the questionnaires and participating in the interviews, and they were also given the opportunity to discuss the ethical protocol if desired. All participants were 18 years of age or older. Once consent was obtained, the quantitative questionnaire with seventeen questions was sent to the participants. The specific questions can be found in the appendix for reference.

7.3. Reflexivity

The nature of my qualitative research connects with my own experiences. I want to express my reasons for the type of research I pursued. Marilys Guillemin and Lynn Gillam state that it is useful to draw 'on the notion of reflexivity as a helpful way of understanding both the nature of ethics in qualitative research and how ethical practice in research can be achieved.'[49] My research adopts a reflexive approach that stems from my personal involvement and insider perspective in the development of the workshop. Through my four-year residency in the ecovillage Kibbutz Lotan in Israel, I immersed myself in sustainable living practises and gained valuable experiential knowledge. Living in close proximity to Bedouin communities in the Israeli desert allowed me to learn from their traditional ecological knowledge and sustainable survival methods. Exploring archaeological sites further enriched my understanding of past civilisations' sustainable practises, including the ancient civilisation of Nabatheen, water roads, and water management systems in the Negev desert. My engagement in permaculture teachings and practical seedball workshops, alongside the theoretical learnings, significantly influenced my research approach. Initially, my motivation for living in Kibbutz Lotan was to learn about permaculture and sustainable living. Attending a seedball workshop back in 2016 empowered me to see that even through simple solutions, I could actively contribute to climate action. The transformation in my knowledge and lifestyle, leading to the establishment of an NGO focused on climate action, emerged from an holistic learning process encompassing various disciplines, practical

[49] Marilys Guillemin and Lynn Gillam, 'Ethics, Reflexivity, and "Ethnically Important Moments" in Research'. *Qualitative Inquiry* Vol. 10: 2 (2004), p.261.

experiences, and theoretical insights. The aim of this research is to explore if the combination of these teachings can create awareness and contribute to the Sustainable Development Goals through a small-scale workshop that educates individuals on practical steps for growing plants and making seedballs, and to find out whether this could affect larger scale climate action.

My qualitative research reflects my interest in fostering connections with nature through collective seed-growing initiatives. This research was inspired by the enjoyment I derive from facilitating workshops on seedballs and tracking the seed growth documented by workshop participants' posted and shared photographs. Phenomenology, as the methodological framework, allows me to comprehend and construct nature's connection. I have observed and thought about how I feel about the growth of my seedballs. I have also photographed them. My seedballs develop into chard. When I first created seedballs, I realised how empowering it was for me. I also recognise that tiny actions can have large effects and contribute to climate action. Seeing and observing seedballs transform into plants is a fascinating experience for me and for my friends and neighbours who are coming to the garden and observing the seedballs. I enjoy caring for them because it strengthens my affinity with nature and encourages me to observe nature more. These observations are made in an attempt to comprehend the plant's requirements and ensure its survival in the wild.

My personal experiences and the transformative effects they have had on my relationship with nature and commitment to climate action are what have motivated my qualitative research on seed-growing initiatives and the use of seedballs. The combination of practical workshops, theoretical knowledge, and experiential learning has shaped my research approach and motivation to explore the potential for small-scale initiatives to contribute to larger-scale climate action. Through a phenomenological lens, I have observed and documented the growth of seedballs and their impact on my relationship with nature, further reinforcing my belief in the power of individual actions to create meaningful change.

7.4. Insider and Outsider

Consequently, the purpose of my research is to determine whether the varied facets of my background can influence the actions and levels of consciousness of others. As a significant component of this investigation, I monitored the growth of seedballs I planted in my own garden after the workshop concluded. Growing my seedballs and observing them

was my phenomenological experience. Jo Pearson, describes herself as 'insider going outsider, going native in reverse', arguing that 'the insider perspective is at least as valuable as that of the outsider.'[50] In addition to giving the workshop and becoming a participant through hands-on and experiential learning, this workshop provides an insight into the perspectives of participants living in a city environment and their challenges with climate change. issues. As a researcher, it is important to acknowledge the potential for bias in my observations and beliefs regarding the efficacy of growing seedballs for climate action and nature. I have a deep personal connection and empowerment derived from my experience in cultivating plants, establishing gardens and fields, and my involvement in ecological projects and education programmes. My NGO, Empower with Nature, is dedicated to this cause. These experiences have shaped my knowledge, understanding of nature, and application of phenomenology in my teaching, learning, and lifestyle. However, it is crucial to recognise that the participants in the research were new to the concept of seedballs, and their knowledge may not be as extensive as mine. This awareness allows for a balanced interpretation of the research findings and an appreciation of the different perspectives presented. I believe that in education, it is crucial to be both an insider and an outsider to understand things from the student's or participant's perspective. As Melanie Green reported, '[t]he amount of insider research being conducted has increased in recent years; much of this research is happening within the field of education'.[51] David Hellawell adds that,

> [t]he expansion of professional doctorate programs, such as the Doctorate of Education (Ed.D.), has resulted in more teachers engaging in research in their own educational institutions, known as "practitioner enquiry" within the category of action research[52]

I aim to determine if and how these types of workshops have an effect on people and to determine their scope, with the intention of modifying or implementing aspects accordingly in our education methods and techniques and understanding their actual effects on the participants.

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[50]Jo Pearson, 'Going Native In Reverse: The Insider As Researcher In British Wicca', cited in Elizabeth Arweck and Martin Stringer eds., Theorising Faith: The Insider/Outsider Problem (Birmingham: University Press, 2002), p.102.
[51] Melanie J. Greene, 'On The Inside Looking In: Methodological Insights And Challenges In Conducting Qualitative Insider Research'. *The Qualitative Report 19 No*. 29, (2014),.pp.1-13, (p.12).
[52] David Hellawell, 'Inside-Out: Analysis Of The Insider-Outsider Concept As A Heuristic Device To Develop Reflexivity In Students Doing Qualitative Research', *Teaching in Higher Education*, 11(4), (2006), pp. 483-494, (p.483).

In conclusion, mixed methods of research are used, including qualitative and quantitative research, the latter using one-on-one interviews, which also employ the reflexivity of my own experience with seedballs and my observation of reflexivity, as well as being both an insider and an outsider of the hands-on stages of the growing stage of the seedballs, which will influence the analysis and results.

8. Main Text

8.1. Field Research and Analysis

In this study, both quantitative and qualitative methods were used to gather data. This allowed for a statistical analysis to examine the relationship between teaching methods and their effects on ecological consciousness and nature connections. In the qualitative approach, interviewees were identified as Participants A, B, C, and D.

8.2. Ecological Consciousness and Nature Connection, Awareness, And Behavioural Change

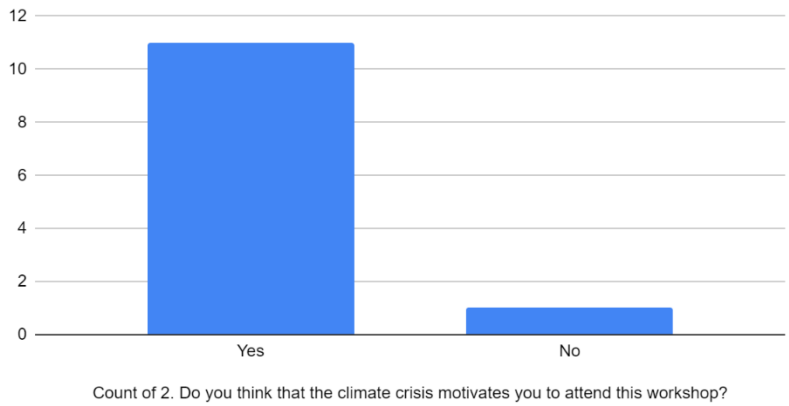

Figure 4 Do you think that the climate crisis motivates you to attend this workshop?

In an exploration of the underlying motivations behind participants attending the workshop on ancient seeds, natural farming, and seedballs, this study investigates the influence of the climate crisis on individuals' decision to engage in the workshop, as reflected

in *Figure 4.* Other than one participant, all the participants believed that the climate crisis had affected their drive to participate in the workshop.

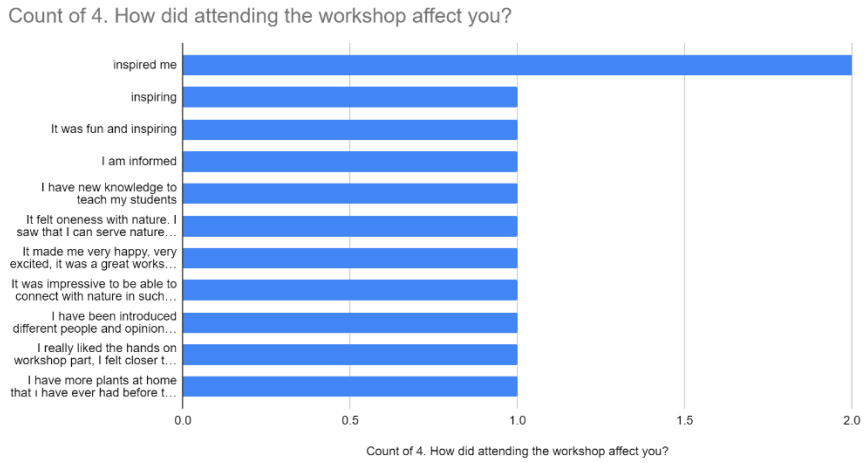

Figure 5 How did attending the workshop affect you?

In assessing the impact of attending the workshop on participants, *Figure 5* reveals that the majority found it inspiring, while others highlighted the informative nature of the workshop and the acquisition of new knowledge. One participant responded, 'It was impressive to be able to connect with nature in such an easy way. Contributing to nature seemed very difficult and arduous due to my limited knowledge. My perspective has changed.' Another person responded, 'I really liked the hands-on workshop part; I felt closer to nature.' An additional participant mentioned 'feeling oneness with nature. I saw that I could serve nature with my hands.'

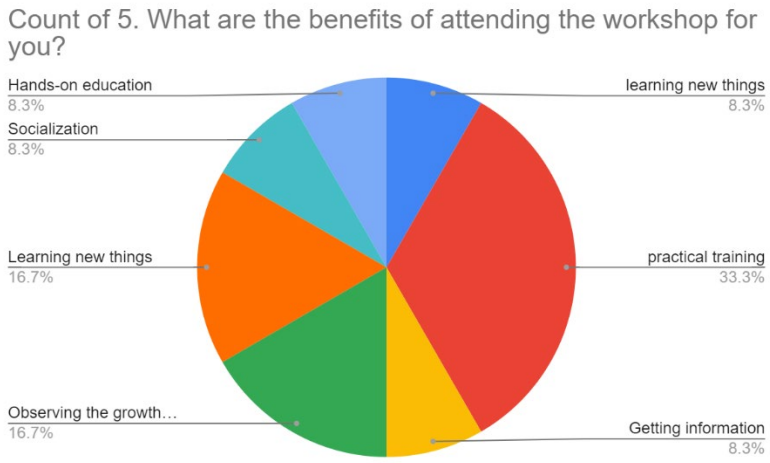

Figure 6 What are the benefits of attending the workshop for you?

In analysing the benefits of attending the workshop, *Figure 6* highlights that participants greatly value the practical learning and experiential training provided, as well as the acquisition of new knowledge. The findings from *Figure 6* indicate that the workshop's emphasis on practical learning and experiential training, coupled with the acquisition of new knowledge, proves to be highly advantageous for participants. The opportunity for information-sharing and social interaction further enhances the overall benefits gained from the workshop.

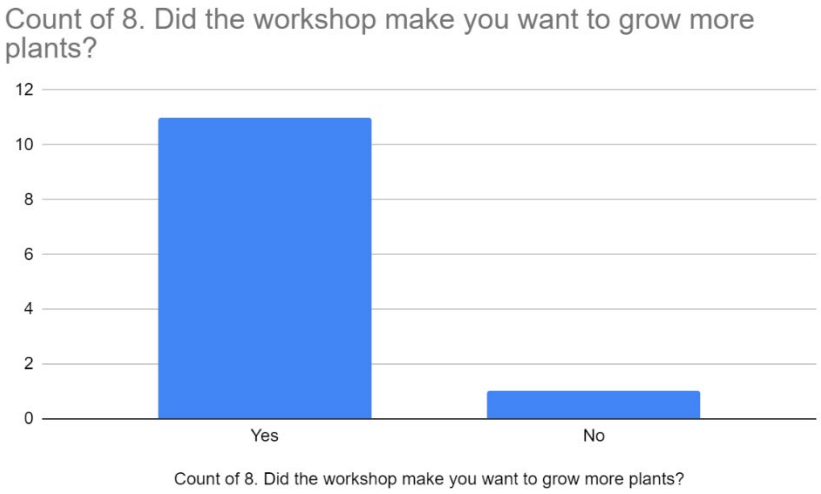

Figure 7 Did the workshop make you want to grow more plants?

In order to assess the impact of the workshop on participants' inclination towards plant cultivation, the question “Did the workshop make you want to grow more plants?” was posed, and the results presented in *Figure 7* indicate a noteworthy majority of participants expressing an increased desire to engage in plant cultivation following the workshop.

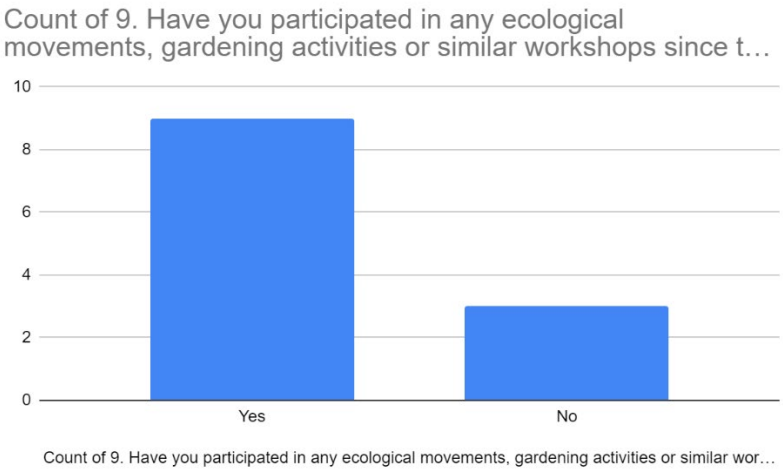

Figure 8 Have you participated in any ecological movements, gardening activities, or similar workshops since the workshop?

Figure 9 Are you active in climate action?

In order to gain insight into the participants' prior engagement in climate action and gardening practises, as well as their level of pre-existing knowledge, the questions ‘Have you participated in any ecological movements, gardening activities, or similar workshops prior to attending this workshop?’ and ‘Are you active in climate action?’ were posed. This was done to examine whether the workshop attendees represented a diverse range of individuals, both those already involved in environmental initiatives and those who were newly interested. The analysis of *Figure 8* reveals that a majority of participants have engaged in other ecological movements, gardening activities, or similar workshops since attending the workshop,

although this cannot be directly attributed as an aftereffect of this specific workshop. To further assess the participants' involvement in climate action, the question from *Figure 9* was asked, and the responses were compared. Regarding behavioural change, it is evident that attending the workshop instilled a willingness among participants to engage in other workshops or activities promoting climate action. However, it cannot be solely attributed to the workshop as the determining factor in driving these behavioural changes.

During the qualitative interviews, participants were later asked, 'Do you feel responsible for being part of climate action?' Participant A responded, 'For action on climate. I'm interested, but I don't join protests. I mostly just watch your work or go to art galleries. I don't do enough to stop climate change. I need to work harder. I don't know where to start. Making seedballs was a good start, but I need people like you to give me more advice. How I can join in and how I can be engaged. If not, we go back to our normal lives and forget to do anything. I feel like I do need more directions.' Participant B mentioned, 'But by planting seed balls, I didn't do anything to help the climate. I think I need to read and learn more before I can do something to help the climate. Even though I felt responsible for how my seedballs grew and checked on them often, I know that tackling climate change will require a deeper understanding of and commitment to sustainability measures.' Participant C answered, 'I think I am more careful, caring, and observing, and I am really noticing lots of things in nature and in general about the climate crisis. Unfortunately, we can feel the effects of climate change. I am more careful with my actions, and I do feel responsible.' Participant D said, 'I used to believe that there was little I could personally do in terms of climate action. The overwhelming number of people and their lack of knowledge about what actions to take contributed to this feeling. However, after attending the workshop, my perspective shifted. I realised that I was partially responsible for climate action, although subconsciously. The workshop brought this responsibility to the forefront of my consciousness, making me realise that I have the ability to make a difference. Climate change and agriculture are frequent topics of discussion, often leaving us feeling powerless. However, this workshop opened my eyes to the fact that taking action is easier than we think and that we can all contribute meaningfully towards making positive change.'

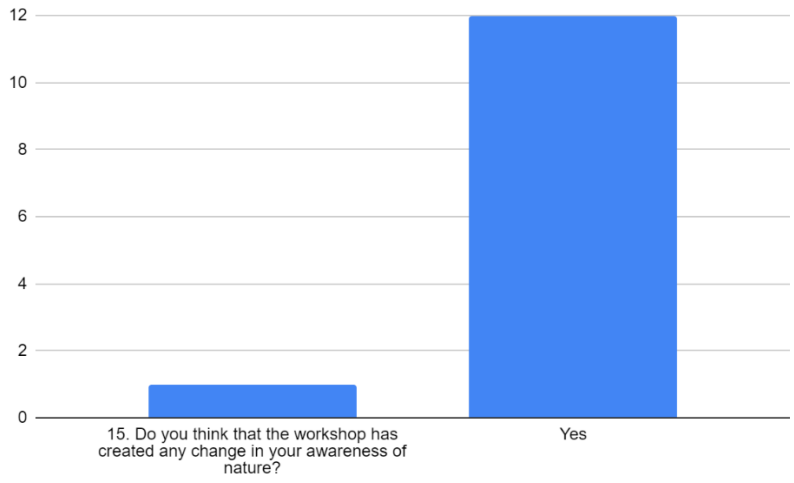

Figure 10 Do you think that the workshop has created any change in your awareness of nature?

In assessing the impact of the workshop on participants' awareness of nature, *Figure 10* indicates that all but one participants acknowledged a positive impact on their awareness of nature as a result of attending the workshop.

Lastly, the quantitative research asked, 'Did the workshop change your thinking? If so, how?' This question was asked to find out if the workshop has any effect on ecological consciousness. As one participant mentioned, 'It does affect the way you look at nature.' Another participant stated that 'it showed how connected our present problems are with the past.' It shows why it's important to explain a topic from past to present knowledge. One participant stated, 'I learned how today's climate crisis started and I saw their solutions.' Ten other attendees also gave similar responses to this question.

Inspired by the above responses, further questions were later asked at the one-on-one interviews, including 'Do you think the workshop changed anything in your behaviour towards nature? If yes, please give some examples.' Participant A responded, 'It takes time for people to change their habits, so we need more workshops. I started to watch how I was acting. I began to look after my plants. Even after six months of the workshop, I am still interested in nature. I am now more into it, but I am forgetting about the knowledge I gained at the workshop. I think that it's important to keep practising and reinforcing what you learned in the workshop.' Participant B responded, 'Yes. I observe nature more than I used to. I read more about antique seeds from ancient times. I am also interested in antique recipes.' Participant C answered, 'This workshop has changed my way of thinking and acting in a big way. The more I look around, the more I notice seedballs and the magic they bring.

In my own garden, I've learned more about the role birds play in planting seeds and making plants grow. It's like a seedball in the wild. I've started noticing and appreciating the flowers that show up out of nowhere. I've learned that the birds bring them from my neighbor's garden to mine.' Participant D mentioned, 'I used to believe that agriculture was challenging, but this workshop completely changed my perception. I discovered that working with seeds can actually be quite simple and straightforward. As someone who has spent a significant amount of time living in a city, reconnecting with nature and immersing myself in its tranquilly felt like coming home. This newfound connection with nature has transformed my perspective and brought a deep sense of fulfilment.'

Also, the following question has been asked in the interviews: 'Do you think this workshop has had any behavioural or awareness changes in you about your actions in nature?' If so, please give an example. Participant A answered, 'Yes, I started to pay more attention to things, especially my own plants and the plants I see on my walks in the parks. But I don't know what to do to take better care of things. I now pay more attention to my plants and the plants I see when I walk. It began with my home and the plants I had there. I wouldn't say I could comprehend, but I did start to understand. I learned that the best way to take care of plants is to know what they need, like how much water and light they need. With this new knowledge, I was able to make a better plan for taking care of my plants and enjoy the beauty of nature even more.' Participant B stated, 'Yes, it has changed my awareness and behaviour. The workshop made me wonder how seeds grow. I started to observe nature more than I used to.' Participant C responded, 'Yes, the workshop made me act and think in different ways. You had a very interesting way of teaching. I'm a little bit more careful about the environment now, and I think I do the best I can with trash, recycling, and starting to make compost in my garden.' Participant D said, 'This experience completely shifted my awareness, revealing that I have the ability to accomplish so much more. It also had a profound impact on my behaviour. I found myself observing the growth of my seedballs and actively seeking out additional workshops and gardening activities to participate in. The positive effect of this experience initiated a significant change in my behaviour, motivating me to engage more proactively in actions that contribute to a greener future.'

This research analysis suggests that participants with an interest in climate change benefited from attending a workshop focused on raising awareness, observing, and connecting with nature. The participants recognised the value of initiatives like seedballs in climate action but emphasised the importance of gaining more in-depth knowledge and

experience. These findings highlight the significance of longer-term education, confidence, and experience in empowering individuals to take meaningful action on climate change.

9.1.3. Ecological Consciousness and Connecting History to the Present: Theoretical Learning

In the context of ecological consciousness, this part of the research explores the significance of connecting historical knowledge to present theoretical learning in order to comprehend the impact of ancient farming methods on climate change. All the participants answered the question, 'Did learning about today's farming issues using ancient methods help you understand climate change?' Yes. All participants emphasised that 'gaining insight into modern-day agricultural challenges through ancient methods helped them grasp the complexities of climate change'. Three participants responded, 'The history of the seed shows what has been done to this day and why we are in this position today'. Another participant stated, 'the history aspect shows why agriculture is returning to natural methods today'. One participant mentioned that 'The purpose of this workshop was to help us understand the process of natural farming during the previous centuries and how we can approach this method today with seedballs. Plus, it shows us how we can learn from nature'. Another response is 'Transferring the knowledge that comes from ancient times and experiencing being part of growing the plants as if they were your own very precious flowers'.

All participants in the analysis agreed that learning about today's farming issues through ancient methods helped them gain a better understanding of climate change. They highlighted that exploring the history of seed usage provided insight into the current agricultural challenges and the reasons for the adoption of natural methods.

8.4. Ecological Consciousness: Hands-on and Experiential Learning

In the realm of ecological consciousness, this research investigates the transformative effect of hands-on and experiential learning on participants' connection with nature, specifically through the process of making and growing seedballs. The question, 'How does the experience of making and growing a seed ball affect your connection with nature?' is asked by the questioner, and one participant responds, 'Nature allows me to look and see the connected side of me. The seed ball is like the first stage of bonding, looking after, caring for,

and growing'. Another participant also stated, 'Unfortunately, I did not see them grow, but still, I feel really lucky to be part of it and have the knowledge now so I can do it by myself in the future'. One participant responded about seedballs, saying that 'We can make seed balls ourselves and that we can collectively make rapid agriculture'. Another participant mentioned, 'It made me see that I could establish a one-to-one connection with nature. Seed balls made farming more fun'. One participant stated, 'Seed balls made us realise that wherever we are, I can return to nature and connect'.

During the further one-on-one interview, it was asked, 'How do you think doing seedballs, using the hands-on method, affected you? 'Do you think hands-on learning has an effect on your learning experience?' Participant A responded, as 'Not only me but also my friends, who were also at the workshop, were affected. Not only hands-on, but also together with the presentation, connecting with the history and journey of it, and then doing the seedballs and their technique, we can take them to nature. Hands-on makes the difference; if it were just the presentation, it would not be enough influence and inspiration. I felt more like I was part of it.' Participant B responded, 'Doing something with hands is always instructive and impactful. When I participated in the seedball activity and got my hands dirty, I felt more connected to the material and the process'. Participant C added, 'Yes, I found it very interesting. To do the seedballs myself. You can feel the things. It also felt like something I made myself, like a magic ball. It uses more than one sense, like touch, sight, and, in some cases, even smell, to make learning more immersive and memorable. I could feel the texture of the soil'. Participant D stated, 'Of course it was a very interactive way of learning. It had many benefits for me'.

The research explores the impact of hands-on experiential learning, specifically seedball making, on participants' ecological consciousness. Participants express a stronger connection with nature, enhancing their senses and learning experiences. Individual interviews show that this approach enhances participation and makes learning more immersive and memorable.

8.5. Responsible Learning and Outdoor Phenomenological Experience

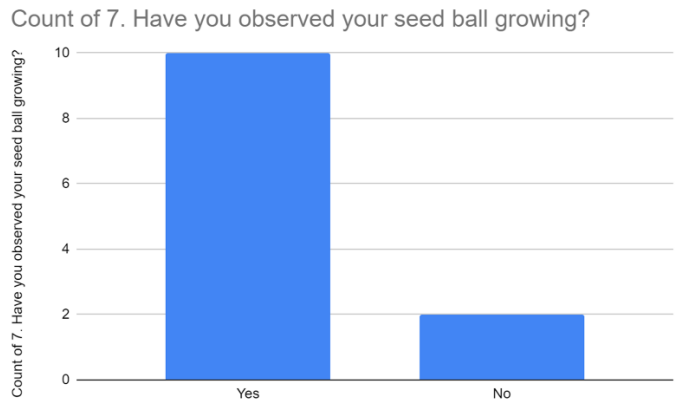

Figure 1 Have you observed your seedball growing?

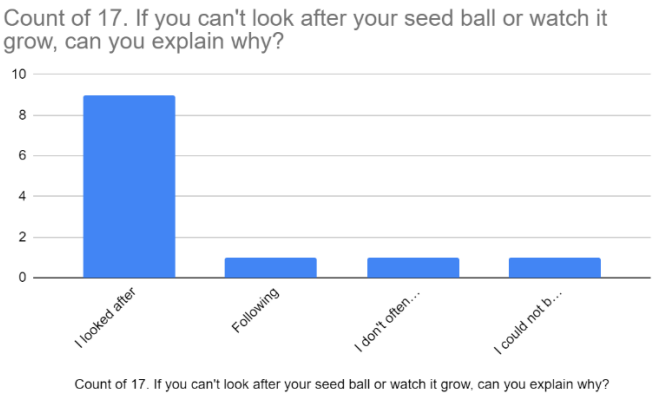

Figure 2 If you can't look after your seedball or watch it grow, can you explain why?

In order to explore the principles of responsible learning and the impact of outdoor phenomenological experiences, the questions 'Have you observed your seed ball growing?' and 'If you can't look after your seed ball or watch it grow, can you explain why?' were asked to gain insight into participants' engagement and connection with the growth process of their seed balls. *Figure 1* shows that most participants looked after their seedballs and actually took responsibility for taking care of them. Participants who could not look after their seedballs, shown in *Figure 2*, explained, 'I could not because they dug the part I threw the seed balls in the park after a few weeks.' Another states, 'I don't often see my friend to whom I gave a few seed balls, so I do not know what they have done.' I threw one in a park. However, *Figure 2* demonstrates that participants tended to their seedballs in the majority of cases.

The question 'How does this workshop promote nature-related learning?' was asked. Participants mostly mentioned that the workshop inspired them and made them want to plant

different seeds and plants. One participant mentioned, ‘I understand how plants grow in a natural environment. This came from observing and taking care of the seedball.’ Another mentioned ‘watering the seed balls and looking after them.’ This also shows they observed their seedballs and were responsible for taking care of them. Another participant stated that ‘it aroused my natural curiosity and inspired me to learn many other techniques.’ Further participants stated that ‘the workshop made me look at myself and think about how I could move towards this field.’ One mentioned that ‘observing nature, transforming from a seed into a plant, experiencing the transformation of nature, and eating the plant I had grown in order to observe and understand the elements of nature while doing all this makes me a part of a whole cycle.’

The next question asked at the qualitative interviews of participants was: ‘Did you feel responsible for the growth of your seedball?’ Participant A answered, ‘Yes, I felt responsible for the growth of my plants. I really wanted them to grow. Unfortunately, they have not grown. But I would really want to see it. When you grow plants, you feel like you are part of them. However, it made me buy more plants for my home and be very careful with them.’ Participant B responded, ‘Yes, I felt responsible for my seedballs. I checked on them every day. It was nice to see them grow’. Participant C stated, ‘Yes, I felt responsible for the seedballs and for their growth, and I wanted to see for myself how they were growing and what was happening. I could observe their growth firsthand and ensure they were receiving the care they needed.’ Participant D mentioned, ‘I felt a sense of responsibility. I took care of the seedball diligently, and watching it flourish brought me joy. Engaging in this activity was truly inspiring, particularly witnessing the results and growth firsthand. Climate change and its effects on agriculture are frequently discussed topics, often leaving us feeling helpless. However, this workshop opened my eyes to the fact that taking action is easier than it seems and that we can make a difference’.

The findings show that most participants took responsibility for caring for their seedballs, while the few who couldn’t cited reasons such as not being able to monitor them. Participants also expressed a sense of responsibility for the growth of their seedballs and reported feeling motivated to care for plants but not necessarily feeling responsible for taking action against climate change.

9.1.6. Transdisciplinary learning and Ecological Consciousness

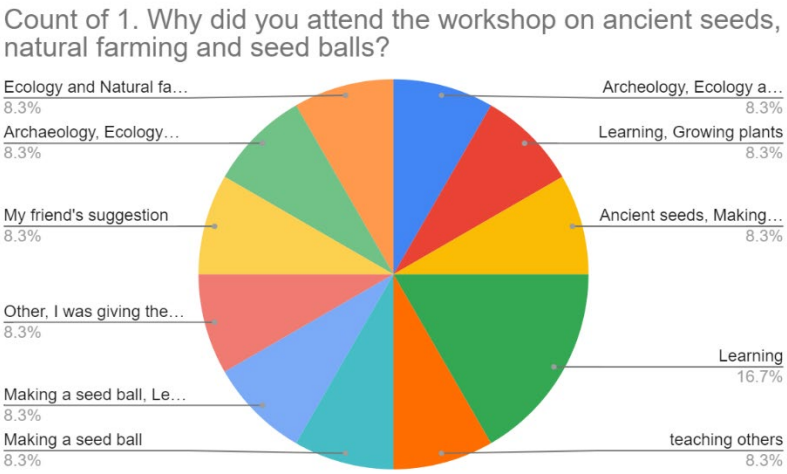

Figure 3 Why did you attend the workshop on ancient seeds, natural farming and seedballs ?

The motivations and diverse interests of participants attending the workshop on ancient seeds, natural farming, and seedballs are examined in *Figure 3,* shedding light on the transdisciplinary appeal of the workshop and the various aspects that attracted individuals to participate. *Figure 3* provides insights into the motivations behind participants' attending the workshop. Their reasons varied, with some expressing interest in learning about ecology, seedball making, ancient seeds, and the archaeological aspects of the workshop. Others mentioned their desire to cultivate plants. The diverse responses indicate that the workshop's transdisciplinary nature appeals to a wide range of individuals, encouraging their participation.

The question 'What do you think is the purpose of the ancient seeds, natural farming, and seed balls workshop?' was asked to evaluate the transdisplinary teachings' purpose. One participant responded, 'To explain the climate crisis in the world through agriculture in a holistic way,' and two other participants mentioned similar responses. Another participant responded, 'To show that we can turn to nature even in crowds, among huge buildings.' Three more participants gave similar responses, and one mentioned, 'Raising the level of awareness about nature and natural agriculture, strengthening the connection of the individual with nature, and enabling individuals to work with nature actively and one-on-one.'

The question 'How do you think experience (making seed balls), observing your seeds, and knowledge can change a person's connection with nature?' was asked to comprehend how all the employed teaching methods and disciplines affected the participants. One responded, 'After the workshop, whenever I was in a natural environment, my perspective on looking at nature changed. The workshop promotes learning with

connectedness by showing, since ancient times, how the history of nature is connected to human history. Even the world's “civilization” has the root of cultivating. Looking at nature is like looking at mathematics, physics, philosophy, music, etc.’ All participants reported a strengthened nature connection and a greater appreciation for their role in the natural cycle. In addition, one participant mentioned, ‘I learned how to make seeds by hand from the past to the present, and seedballs have helped with many natural disasters using modern technology.’

Further questions were asked during the interviews about the understanding of transdisciplinary and mixed methods of teaching and their effect on participants. The question asked was, ‘If you only had a presentation and did not have hands-on experience making or observing your seed ball, what do you think would be missing from the purpose of the workshop?’ Participant A responded, ‘Yes, I would benefit from going to another workshop on seedballs. Even though a workshop gave me the idea to plant them in a park, I believe that more training and reinforcement are necessary for long-lasting behaviour change. Going to two or three workshops would give me the support, guidance, and knowledge I need to improve and incorporate making seedballs into my life. I believe that workshops have the power to inspire action.’ Participant B responded, ‘Yes. Listening and practising are two different things. I do not forget something when I do it with my hands. Without the opportunity to engage physically and actively participate in making or observing the seedballs, the workshop would lack the depth and connection that come with hands-on learning. I would be limited to just hearing about the process without truly understanding it through personal experience.’ Also, Participant C mentioned ‘Yes, completely. If it were only listening to a presentation, the learning process would be missing. Experience is crucial. For me, I generally do not experience things growing in nature. It was a great experience to do it myself, and with my hands, I learned a lot. I felt confident that I could do it, that I could grow something, and that it was not difficult. It is not magic or complex; it is simple.’ Participant D said, ‘The hands-on experience is truly tangible. It allows me to give back to nature and feel a genuine connection with the seedball, the earth, and the natural world. Merely learning about this in theory would not be sufficient. There is a practical aspect to it that enriches my understanding. It is through this real-life involvement that I truly grasp the significance and impact’.

During the interviews, a further question regarding transdisciplinary education and consciousness was posed. ‘Do you think this workshop changed anything in your consciousness?’ If yes, please give an example. Participant A answered, ‘My consciousness

changed when there were fires in the southern part of Turkey due to climate change. This wakes me up for the people and the next generation. I do not know what to do. I would like to know more about how we humans are causing this. I do not have a to-do list or knowledge about how to do it, but I am trying my best. I think, on the knowledge side, I do not have enough knowledge. but it made me care more. It made me see things from nature's perspective.' Participant B responded, 'Yet it has changed more about the knowledge of the past and its effect on the present by planting seedballs. Now I am more conscious of the environment in the past and today. I find myself paying closer attention to the plants and wildlife around me, appreciating their role in nature.' Participant C mentioned that 'my way of looking at nature changed a little bit. Even when I am not walking in nature but around the streets, I can notice the herbs growing. It has made me realise that our actions, even in cities, can have a profound impact on the environment. I'm telling myself that there are animal-made seedballs nearby, along with herbs and flowers, and this has altered my perception and consciousness. After this workshop, one can see that the seedballs we made and the philosophy behind them are also made by nature, and we are mimicking nature and actively participating in the cycle of life and growth.' Participant D said, 'This experience made me recognise the inherent connection we all have with nature. It deepened my sense of being intertwined with the natural world. Previously, I understood this concept in a theoretical sense, but this workshop sparked a desire within me to actively engage with seeds and planting. It had a positive impact on my consciousness, heightening my awareness of my role in nurturing the earth. Also, the workshop provided theoretical knowledge about historical aspects and developmental possibilities, equipping me with the knowledge to put it into practical use.'

The findings indicate that different participants were specifically interested in various aspects, including ecology, seedball making, ancient seeds, and the archaeological aspects of the workshop. The participants recognised the workshop's purpose of explaining the climate crisis through holistic agriculture and promoting a stronger connection to nature. The analysis also reveals that the interactive and experiential elements of the workshop were crucial, as participants believed that a presentation alone would not have offered the same depth of learning and connection.

9. Discussion

This section of the research delves into the findings regarding the connection between historical knowledge and present theoretical learning in relation to the impact of ancient farming methods on climate change within the context of ecological consciousness.

All participants agreed that exploring today's farming challenges through ancient methods greatly enhanced their comprehension of climate change. Luppi[53] emphasised the importance of explaining sustainable development, mainly 'the history of sustainable development,' as this history effectively addresses complex issues by giving a full-time frame.

The questionnaires yielded valuable insights, with three participants pointing out the vital importance of comprehending present-day agricultural challenges through an exploration of historical perspectives. By delving into the lessons of the past, these participants were able to develop a profound understanding of the complex agricultural issues of the present. As Sheldrake eloquently states, '[w]e are connected to the past by memory and habit and to the future by desires, plans, and intentions.'[54] This notion exemplifies the inherent interconnectedness between historical comprehension and forward-thinking approaches to addressing contemporary agricultural issues. Additionally, one participant expressed the importance of showcasing the reasons behind the resurgence of natural farming techniques in modern times. Metzner [55] further acknowledges humanity's recognition that indigenous societies represent paragons of sustainable resource management. Indigenous traditional ecological knowledge serves as a living testament, offering valuable insights and a bridge between past and present knowledge about natural and sustainable solutions.

The participants demonstrated a clear understanding of the importance of the origins of contemporary environmental challenges in comprehending the transition from harmonious coexistence with nature to the pressing issues humanity now confronts. Remarkably, one participant highlighted the workshop's purpose as a means to learn from nature. This aligned with Mazzochi's[56] assertion that observations, often orally transmitted through generations, offer valuable insights accumulated over millennia by cultures worldwide. The primary objective of this workshop was to showcase the effectiveness of natural farming techniques employed in previous centuries through indigenous knowledge and illustrate their practical implementation in modern agriculture through the use of seedballs. By embracing and

[53] Luppi, Training to Education for Sustainable Development, p. 3248.
[54] Sheldrake, *Science Set Free,* p. 226.
[55] Metzner, *Green Psychology,* p.10.
[56] Mazzochi, Western Science and Traditional Knowledge, p. 463.

integrating these time-honored approaches, we tap into the wisdom of nature, enriching our agricultural practises with the profound wisdom of ancient knowledge.

As we proceed with studying the lessons from the past, comprehending the solutions, challenges, and subsequent impact on our present world, this understanding necessitates adopting an holistic perspective, particularly through the indigenous lens that embraces natural solutions. Metzner's[57] elucidation of ancient consciousness resonates with these perspectives, noting the belief that the Earth possesses not only vitality but also consciousness. The theoretical aspect of teaching extends beyond the mere transfer of knowledge and skill demonstration; it entails delving into the contextual understanding of methods employed in ancient times, when indigenous cultures recognised and honoured the consciousness inherent within the Earth. Curry asserts that 'theory' itself is just another kind of practice.'[58] The findings of the quantitative research revealed the participants' responses regarding their seedballs' impact on their connection to nature. One participant expressed satisfaction in acquiring the knowledge and theoretical understanding necessary to independently engage in similar practises in the future, aligning with Curry's notion that theory is an integral part of practical application. Moreover, Participant D's insights from further interviews highlighted that the theoretical component of the workshop not only provided knowledge but also equipped participants with the skills and empowerment needed to successfully cultivate plants. Therefore, the integration of ecological consciousness within the theoretical teaching framework serves to deepen our understanding of the subject matter while fostering an inherent connection to the environment.

Examining the impact of hands-on and experiential learning on our ecological consciousness, one participant's questionnaire response was, 'The seedball is like the first stage of bonding.' This indicated that the seedball symbolised an initial stage of connection with nature, illustrating the potential of seedballs as a tool for fostering this bond. This supports Fukuoka's perspective on seedballs as being 'a small universe in themselves.'[59] It further underscores their significance in encapsulating the profound and intricate relationship between humans and the natural world.

Another participant responded, 'We can make seed balls ourselves and we can collectively make rapid agriculture,' which resonates with C. Tamilarasan et al. and they also

[57] Metzner, *Green Psychology*, p.33.
[58] Curry, *Ecological Ethics,* p. 14.
[59] Fukuoka, *The One-Straw Revolution*, p.10.

state that the 'seedball technique is recommended for forest regeneration and re- greening the earth' surface.'[60] Furthermore, the global response to forest fires has facilitated the use of seed balls as a climate action tool. Nwankwo, C.I. et al.'s[61] research supports this trend, demonstrating the effectiveness of seed balls for ecological restoration. Notable examples can be found globally, including in Turkey, where a company called Ecording[62] utilises seedballs, and in Thailand, where seed balls are employed to combat the effects of forest fires, as highlighted by Atlas of the Future[63]. These real-world applications showcase the growing relevance and adoption of seed balls as a practical and sustainable approach to address environmental challenges and promote biodiversity conservation. Participant D mentioned during the interviews that 'Climate change and its effects on agriculture are frequently discussed topics, often leaving us feeling helpless. However, this workshop opened my eyes to the fact that taking action is easier than it seems and that we can make a difference.'

In Dale and Newman's study, they state that

> The content of the courses embraced "the hands-on problem" based learning required of sustainable development education, as well as the transdisciplinary approach needed to familiarise students with the complexities of sustainable development'[64].

Regarding the learning technique and its connection, Participant A responded, 'Hands-on makes the difference; if it were just the presentation, it would not be enough influence and inspiration. I felt more like I was part of it.' Participant B stated, 'Doing something with hands is always instructive and impactful.' Participant C added that this helped '...to make learning more immersive and memorable.' Overall, the experience with seedballs has not only provided knowledge but also deepened the participants' connection with nature and made them realise their potential for being impactful.

This discussion revolves around the effectiveness of learning that engages multiple senses, takes place in a dynamic and real-world environment, and requires social interaction and self-guided involvement of learners, as highlighted by Shaw's[65] research. Participant B

[60] Tamilarasan, Regis and Raja. Seed Ball Technique, pp.270.
[61] Nwankwo, Physical and Chemical Optimisation of The Seedball, p. 68.
[62] Ecording, (2017) https://ecording.org/en/ecodrone/ [accessed 10 October 2022].
[63] Atlas of the Future, (2017) https://atlasofthefuture.org/project/aerial-reforestation-in-thailand/ [accessed 10 October 2022].
[64] Dale and Newman, Sustainable Development, pp. 358.
[65] Shaw, *The Memory Illusion,* p. 13.

shared their personal experience of the seedball activity, expressing that 'I got my hands dirty and felt more connected to the material and the process.' Participant C further supported this perspective by mentioning, 'It uses more than one sense, like touch, sight, and in some cases even smell, to make learning more immersive and memorable. I could feel the texture of the soil's personal involvement in creating a sense of ownership and engagement.' The discussion thus highlights the value of multi-sensory and experiential learning methods in promoting effective learning outcomes and being part of nature's cycle.

The discussion focuses on the principles of responsible learning and the impact of outdoor phenomenological experiences. *Figure 1* shows that most participants looked after their seedballs and actually took responsibility for taking care of them. This responsible learning is seen as a form of observation that is a kind of intervention, as highlighted by Curry.[66] As Schroll[67] suggests, the experiential nature of the workshop influenced participants, leading to the accumulation of knowledge, the acquisition of new skills, and a desire to contribute to climate action. However, there were instances where participants faced challenges in looking after their seedballs, as shown in *Figure 2*. The research observing failures in this area of environmental education is mentioned as a desire to contribute to climate action. Where participants faced challenges in looking after their seedballs, is shown in *Figure 2.* Despite these challenges, the majority of participants demonstrated a commitment to caring for their seedballs. Therefore, the research supports the observations of Blumstein and Saylan about Education in Sustainable Development (ESD), who note that '[t]here have been calls to re-evaluate ESD efforts due to the disconnect between environmental education and personal responsibility.'[68] Participant D mentioned that 'Engaging in this activity was truly inspiring, particularly witnessing the results and growth firsthand.' In the context of exploring how the workshop promotes nature-related learning, participant responses highlighted the inspiring nature of the workshop and its influence on their desire to plant different seeds and plants. One participant mentioned, 'I understand how plants grow in a natural environment. This came from observing and taking care of the seedball.' Another participant mentioned 'Watering the seed balls and looking after them as a valuable part of the process. The act of observing and revisiting the seedballs transformed the learning experience into a phenomenological one, aligning with Kant's[69] assertion that our

[66] Curry, *Ecological Ethics,* p. 13.
[67] Schroll, *Transpersonal Ecosophy*, p. 50.
[68] Blumstein and Saylan, *The Failure of Environmental Education,* p.95.
[69] Kant, *Theoretical Philosophy*, p. 237.

experience of the environment is always mediated by our senses. One participant mentioned that 'observing nature- transforming a seed into a plant, experiencing the transformation of nature, and eating the plant I have grown in order to observe and understand the elements of nature - all this makes me a part of a whole cycle.' This aligns with Bohm's concept of phenomenological sensing and ecological consciousness, where 'matter is projected from the whole.'[70]

In a different study conducted by Nathália Rigui Trindade et al.,[71] they suggest that adopting experiential learning theory (ELT) as a foundation for initiatives can lead to desired outcomes in sustainability education. This approach not only facilitates the acquisition of knowledge but also encourages individuals to actively implement it in their daily lives. In order to explore the participants' sense of responsibility for the growth of their seedballs, an additional question was posed during interviews. Participant A expressed a strong sense of responsibility, stating their desire for the plants to grow and their disappointment that they did not succeed. Participant B similarly felt responsible for their seed balls and checked on their growth daily, finding it gratifying to witness their development. Participant C also acknowledged their responsibility and expressed a desire to observe firsthand how the seedballs were growing and progressing, ensuring they received the necessary care. Curry's[72] perspective on observation as a form of intervention is pertinent here. Pretending otherwise would be an attempt to evade acknowledging and taking responsibility. Taking care of seedballs cannot be generalised as being responsible for climate change.

Upon examining the research data, it becomes evident that transdisciplinary learning has a significant impact on fostering ecological consciousness. The insights provided by *Figure 3* shed light on the motivations behind participants attending the workshop, revealing a diverse range of interests and goals. Some participants came to the workshop with a desire to learn about ecology, seedball creation, ancient seeds, and the archaeological aspects of these. Others were more focused on cultivating plants. This aligns with Clark and Button's[73] assertion that transdisciplinary approaches encompass both a fresh perspective and a lived experience. The workshop's ability to appeal to a wide range of individuals through its transdisciplinary nature showcases its effectiveness in encouraging participation.

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[70] David Bohm, 'The implicate order: The holodynamic model of the universe'. *Science and Mysticism: Exploring the New Realities Conference (Cambridge, MA:* Harvard Science Center, Harvard University,1984) [Published in David Bohem, *Unfolding Meaning: A Weekend of Dialogue*, (London and New York: Routledge, 1985) pp.1-25.
[71] Trindade, etc.al. , Experiential Learning To Promote Education For Sustainability, p.90.
[72] Curry, *Ecological Ethics,* p. 13.
[73] Clark and Button, Sustainability Transdisciplinary Education Model. p.42.

Additionally, the responses regarding the purpose of the workshop indicate a need for a holistic understanding of the climate crisis and its relationship to agriculture. This resonates with Clark and Button's[74] idea of transdisciplinary knowledge, entailing both a new vision and a lived experience. The promotion of ecological consciousness and the importance of reconnecting with nature in urban settings complement the transdisciplinary learning approach of the workshop.

Participant C's reflections on the nature of mathematics, physics, philosophy, music, and other disciplines as inherent components of observing and appreciating nature further highlight the interdisciplinary nature of the workshop. Also during the qualitative research, Participant C mentioned, 'We are mimicking nature and actively participating in the cycle of life and growth,' and Participant D added, 'The workshop provided theoretical knowledge about historical aspects and developmental possibilities, equipping me with the knowledge to put it into practice.' This echoes the call made by scholars such as Luppi[75], Dale and Newman[76], and Eagan et al[77] for the adoption of an interdisciplinary approach to sustainable development education.

Participant A's response was 'Raising the level of awareness about nature and natural agriculture, strengthening the individual's connection to nature, and enabling individuals to work actively and individually with nature.' Brier adds, '[t]he modern evolutionary paradigm combined with phenomenology forces us to view human consciousness as a product of evolution as well as accept humans as observers from the 'inside of the universe'.[78] This perspective highlights the importance of recognising the interconnectedness between humans and the natural world. By acknowledging our role as observers within the universe, we can foster a deeper understanding and appreciation for nature, leading to a more sustainable and harmonious relationship with our environment.

In summary, the experiential learning, observation of seeds, and interdisciplinary approach of the workshop resulted in a profound shift in the participants' perspectives of nature, fostering a deeper connection and a greater appreciation for the interconnectedness of nature with academic disciplines and human history. Whether this workshop alone influenced their behaviour and attitudes is a separate question.

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[74] Clark and Button, Sustainability Transdisciplinary Education Model. p.53.
[75] Luppi, Training to Education for Sustainable Development, p. 3248.
[76] Dale and Newman, 'Sustainable Development, Education and Literacy', p. 358.
[77] Eagan, Cook and Joeres, Interdisciplinary Education for Sustainable Development, pp. 48 66.
[78] Brier, Cybersemiotics, p.97.

The findings of this research provide insights into the connection between ecological consciousness and changes in awareness and behaviour. *Figures 5, 6, and 7* demonstrate that the workshop transforms its participants. According to the findings, the programme inspired, enlightened, and connected people to nature and increased plant growth. *Figure 7* demonstrates an increased ecological awareness, a connection to nature, and a desire for behavioural change. In addition to teaching practical skills and fostering socialisation, the course altered participants' perspectives. Thus, attendees felt more empowered to protect the environment. Nevertheless, during the research, participants mentioned they needed more time, experience, information, and knowledge.

The findings depicted in *Figure 5, Figure 6*, and *Figure 7* provide substantial evidence that the workshop had a significant transformative impact, aligning with Spirkin's[79] assertion that consciousness fosters deep contemplation and productive innovation. Through the workshop, participants reported feeling inspired, gaining a wealth of knowledge, and developing a stronger bond with nature. These outcomes indicate a heightened level of awareness among the participants. However, it should be noted that while these results suggest a potential shift in consciousness, they do not directly demonstrate a change in behaviour. Further investigation is required to ascertain whether the workshop's effects extend beyond mere consciousness and translate into tangible behavioural modifications.

Figures 8 and Figure 9 reveal that a significant proportion of the workshop attendees were actively involved in climate action and engaged in various environmental activities prior to the workshop. This indicates a potential self-selection bias, as individuals who are already committed to climate action are more likely to seek out and participate in similar workshops. The shared motivation among participants suggests a common goal and an opportunity for collective impact in fostering ecological consciousness and promoting behavioural change.

According to Sheldrake[80], consciousness can be understood as a field state characterised by resonance. Consequently, participants who possess a rapport with climate action and engage in similar workshops are likely to have their consciousness impacted in relation to climate concerns. This suggests that workshops of this nature have the potential to influence the consciousness of participants who are already concerned about climate issues.

[79] Spirkin, *Fundamentals of Philosophy*, p.99.
[80] Sheldrake, Science Set Free, p. 199.

During the interviews, it was evident that Participant A, despite expressing a sense of responsibility for climate action, felt a need for further guidance and direction. Similarly, Participant B pointed out the significance of acquiring a deeper understanding and more knowledge before engaging in climate action. Participant C highlighted increased awareness and mindfulness regarding the climate crisis. These individual reflections reveal the presence of personal biases and experiences, which contribute to the complexity of individual perspectives on climate action and responsibility. As a result, it becomes evident that while the workshop may have successfully raised awareness and prompted some behavioural changes, it is not sufficient on its own. To effectively engage in climate action, participants require additional skills and knowledge. Bohm's[81] explanation of the projection of archetypal forms into matter and their subsequent integration of experiential knowledge from the material world, followed by re-projection, presents a particular perspective rooted in a specific theoretical framework.

Nevertheless, it is worth acknowledging that smaller workshops can still play a vital role in inspiring individuals and fostering a sense of responsibility. While cultivating this sense of responsibility may contribute to the practise of growing seeds, it is crucial to recognise that this alone may not be sufficient for driving broader climate action or assuming larger roles in environmental conservation efforts. To obtain a more objective understanding, future research should employ rigorous study designs that account for potential biases in participant selection and integrate diverse perspectives on the relationship between consciousness and climate action. The workshop was open to the public, and participants were booked on a first-come, first-served basis. There was no basis for the selection. Nevertheless, we observe that those who attended are more climate-change-conscious individuals, which also supports the research.

The findings from *Figure 4* imply that the participants' conviction about the urgency of climate crises had a significant impact on their decision to attend the workshop. This finding may indicate a bias among participants who already hold a pre-existing commitment to climate action, as individuals with a lesser sense of urgency may have been less inclined to attend.

[81] David Bohm, 'The Implicate Order: The Holodynamic Model of the Universe'. *Science and Mysticism: Exploring the New Realities Conference (Cambridge, MA:* Harvard Science Center, Harvard University,1984) [Published in David Bohem, *Unfolding Meaning: A Weekend of Dialogue*, (London and New York: Routledge, 1985) pp.1-25.

The analysis of *Figure 10* from the quantitative research indicates that a majority of workshop attendees experienced a change in their awareness of nature. This finding reinforces the workshop's role in fostering ecological consciousness and promoting a connection with the natural world. Although the workshop did not explicitly aim to induce behavioural change, the results suggest that it had a significant impact on participants' attitudes towards connection with nature.

These findings align with the observations made by Gould,[82] who mentioned the importance of establishing an emotional bond between individuals and nature in order to effectively engage in environmental conservation efforts. The workshop's ability to foster such a bond is crucial for mobilising individuals to protect and preserve the natural world.

In order to gain a deeper understanding of the impact of the workshop, qualitative one-on-one interviews were conducted with participants. Participant A stated the need for time to facilitate the change of habits and described a newfound commitment to caring for plants. Participant B reported an increased observation of nature, while Participant C expressed appreciation for the unexpected appearance of flowers and recognised the role of birds in planting seeds and facilitating the growth of plants. This enhanced comprehension has deepened the participants' appreciation for the natural world and heightened their awareness of the interconnectedness of various elements within it.

The participants' experiences indicate that their engagement with nature during the workshop has fostered ecocentrism, environmental ethics, and a deeper connection. Curry[83] suggests that an ecocentric view encompasses concern for both nonhuman nature and humans. The responses support this notion, as participants began to adopt a perspective that considers the viewpoints of plants and birds. Additionally, Participant D shared their experience of working with seeds, highlighting the simplicity and straightforwardness of the process. Through this engagement, they developed a profound connection with nature that significantly changed their perspective. This transformation not only affected their understanding of the natural world but also brought them a deep sense of fulfilment.

The experiences and perspectives shared by the participants in this research exhibit a deeper attunement and alignment with the intricate web of nature. This is a positive outcome

[82] Gould, *The Book of Life,* p. 4.
[83] Curry, *Ecological Ethics,* p. 4.

of the workshop, with the increase in nature observation suggesting a possible shift towards an ecocentric perspective and mentality.

However, it is important to acknowledge that the research cannot definitively conclude that participants fully reached the stage of identifying themselves with nature, as described by Naess[84]. The reported experiences and perspectives indicate progress towards this ecological consciousness, but further exploration into long-term effects and continued education programmes may be necessary to foster a deeper and more ingrained connection with nature. Moreover, the participants themselves recognised the need for more time and additional education programmes.

This research explored the potential impact of a workshop on participants' behaviour and awareness of nature through qualitative interviews. The findings revealed several positive effects of the training. Participant A demonstrated increased attention to their own plants and those in parks, attributing it to the knowledge gained during the workshop. They recognised the importance of understanding plants' specific needs and used this understanding to enhance their plant care practises. This resulted in a deeper appreciation of nature. Similarly, Participant B reported a change in awareness and behaviour, specifically related to increased observation of nature and sparked by curiosity about seed growth. Participant C highlighted the workshop's influence on their environmental consciousness and subsequent actions. They exhibited a heightened awareness of their environmental impact, engaging in activities such as composting, recycling, and improved waste management. Participant D experienced a transformative shift in their self-awareness, motivating them to actively seek out gardening classes and activities. This positive impact led them to become more proactive in taking action towards a greener future.

Ingold [85] highlights that participant observation is a way of knowing from the inside, which aligns with the experiences shared by participants. By observing and growing seedballs, participants gained a deeper understanding of and connection with nature. This accentuates the potential of participant observation as a means to achieve a more intimate knowledge of the natural world. Although these findings suggest positive outcomes, it is important to acknowledge some limitations. The size of this study was limited, which may affect the generalisability of the results. It is possible that the participants in this study were

[84] Naess, *Ecology of Wisdom*, (Penguin Books Ltd. Kindle Edition), p.229.
[85] Ingold, *Making: Anthropology*, p.5.

already more inclined to have an interest in nature or environmental issues, which could have influenced their responses.

10. Conclusion

This dissertation has investigated the impact of participating in two antique seed, natural farming, and seedballs workshops on individuals' sense of connection to nature and whether the incorporation of theoretical and practical teaching methods, along with transdisciplinary teaching, could enable participants to learn more about environmental protection and take more steps towards it.

The findings of this research confirmed that participating in the workshops led to a significant increase in participants' sense of connection to nature. The research with participants also proves that through interactive and experiential learning activities, they were able to not only gain knowledge about the importance of protecting the environment, the farming issues of today, and creating seedballs but also develop a deeper observation and connection to nature. Furthermore, the incorporation of transdisciplinary teaching and learning from history allowed participants to understand the interconnectedness of various environmental issues and how their actions could have wider consequences over time. This approach facilitated a shift in participants' perspectives from an anthropocentric view of the environment, where human needs and wants take precedence, to a more ecocentric view, where the wellbeing of the entire ecosystem becomes paramount. The implications of these findings extend beyond the individual level, and the question arises whether the teachings and experiences have potential impacts on climate action, behavioural change, and awareness. In order to thoroughly investigate the effects of the antique seed, natural farming, and seed ball workshops on participants' nature connections, this research was conducted in five distinct sections. Each section focused on a different aspect of the workshop and its potential impact on participants' ecological consciousness, awareness, and behaviour.

The first section 'ecological consciousness and changes in awareness and behaviour' explored the link between these concepts. Through a comprehensive literature review, it was established that a stronger connection to nature and increased ecological consciousness can lead to positive changes in individuals' attitudes and behaviours towards the environment. This section provided a theoretical framework for understanding the potential outcomes of the workshop. Furthermore, the workshop provided participants with the opportunity to

engage in participant observation and hands-on activities such as growing seedballs. This experiential learning approach deepened participants' understanding of and connection with nature. As Hunter [86] posits, ecological consciousness is rooted in recognising the interconnectedness of consciousness with all elements of the ecosystem, fostering a sense of unity and relationship.

The literature review provides comprehensive evidence from Luppi.[87], Dale and Newman[88], and Eagan et al[89]. to support the notion that experiential, interdisciplinary, and historically informed hands-on education plays a significant role in transforming both behavioural and ecological consciousness among participants. Nevertheless, it is worth noting that the literature review evidence presented encompasses research studies that were conducted over a span of at least one year. This long-term perspective allows for a more comprehensive understanding of the potential impact of experiential, interdisciplinary, and historically informed hands-on education on behavioural and ecological consciousness. Although the primary research data from the workshop alone may not be sufficient to demonstrate immediate and significant changes, it is crucial to consider that one workshop is a very short amount of time to initiate longer impacts and changes. However, the primary research data collected from the participants of this workshop, did show a slight shift in consciousness of the type Hunter[90] suggests.

The second section, titled 'Ecological consciousness and connecting history to the present: theoretical learning,' explored the significance of integrating historical perspectives into the antique seed, natural farming, and seed balls workshops. By providing participants with an understanding of the historical context of agriculture and the role of antique seeds, they were able to develop a deeper appreciation for the interconnectedness of nature and the impact of historical agricultural practices on present-day challenges such as food security and environmental sustainability. The results of this research emphasise the significance of integrating theoretical learning into workshops of this kind. The incorporation of theoretical elements aimed to cultivate participants' intellectual understanding of the workshop themes and their relevance to contemporary environmental challenges. The research data reveals that by providing historical context, participants were able to comprehend the wider implications

[86] Hunter, Gothic Psychology,p.7.
[87] Luppi, Training to Education for Sustainable Development, p. 3248.
[88] Dale and Newman, 'Sustainable Development, Education and Literacy', p. 358.
[89] Eagan, Cook and Joeres, Interdisciplinary Education for Sustainable Development, pp. 48 66.
[90] Hunter, Gothic Psychology, p.7.

of their actions and develop a heightened awareness of the urgency for climate action. As future environmental education initiatives are formulated, it is crucial to incorporate historical perspectives as a means to provide a comprehensive understanding of how past actions have shaped current issues and potential solutions.

In the third section, titled 'Ecological Consciousness: Hands-on and Experiential Learning,' the research focused on the significance of practical, hands-on activities in enhancing participants' ecological consciousness. By actively engaging in activities such as seedball making, participants were able to directly observe the positive impact of their actions on the environment. The findings of this research indicate that this experiential learning approach not only deepened their connection to nature but also instilled a sense of responsibility towards protecting it. The data revealed that participants who had the opportunity to create seed balls and engage their senses in the process felt more connected to nature. However, it was also evident from the research that some participants may require additional support or repetition of the learning process to fully grasp and continue their involvement with seedball making. Nonetheless, there were individuals who demonstrated great enthusiasm and interest in both creating seed balls and observing how animals in nature contribute to seed dispersal. Overall, both the research and literature review demonstrate that providing opportunities for hands-on learning experiences is crucial to cultivating participants' ecological consciousness. By actively participating in environmental solutions, participants developed a sense of ownership, just as they did for their own seedballs.

The fourth section, 'Responsible Learning and Outdoor Phenomenological Experience,' emphasised the importance of engaging with nature firsthand through growing seedballs. As Ingold astutely noted, 'observation is a way of knowing from the inside.'[91] By immersing themselves in natural environments during the workshop, participants were able to activate their senses and develop a more intimate and empathetic relationship with the natural world. This phenomenological approach fostered a deeper understanding of the environment by encouraging participants to see things from nature's perspective, cultivating respect, and recognising the interconnections between all living beings and ecological systems.

The research findings also indicated that participants felt personally responsible for the seedballs they created and grew more plants after the workshop. However, despite this acknowledgement, it was evident that many participants did not fully internalise or generalise

[91] Ingold, *Making: Anthropology,* p. 5.

the concept of responsibility towards climate change. While they recognised the role of seedballs in climate action, there was a need for further training, education, and knowledge to empower them with confidence in their abilities. Nonetheless, it is essential to emphasise the overwhelming significance of the term "climate action." As participants believe they must know or do a great deal to participate in climate action and cannot see the small effects, they could also contribute to larger issues, such as climate action. Yet, it is important to note that the workshops did have a positive impact on participants' nature connection, ecocentric perspective, awareness, and sense of responsibility towards plants and the environment.

The final section, "Transdisciplinary Learning and Ecological Consciousness," points out the importance of integrating different disciplinary perspectives within the workshop. UNESCO[92] recognises that education for sustainable development requires contributions from all disciplines and emphasises the importance of a transdisciplinary approach. Through exploring the intersections of various disciplines such as history, ecology, agriculture, and sustainability, participants in the workshop gained a deeper understanding of the intricate and interconnected nature of environmental issues. Both the research in the literature review and the research data of the dissertation also supported participants' acknowledgement of the significance of historical knowledge and nature-based solutions, as well as their recognition of how other disciplines can provide valuable insights through observing patterns, numbers, and the philosophy of seedballs in nature. Moreover, the workshop's incorporation of theoretical, hands-on, and phenomenological learning approaches broadened participants' understanding and fostered an holistic and systems-oriented perspective of ecological consciousness.

The present research provides valuable insights into the potential impact of the workshop on nature connection, awareness, and behavioural changes towards environmental protection. However, it is important to acknowledge certain limitations that may affect the interpretation of the findings. Bell and Waters [93] limit the generalisability of small-group research results and call for caution when extrapolating them to larger populations. Additionally, the varying levels of pre-existing interest in nature among participants may have influenced their responses, potentially skewing the true impact of the workshop alone. The findings suggest that while the workshop has the ability to foster ecological consciousness and inspire participants, it should be seen as just the beginning rather than a

[92] United Nations Educational, Scientific and Cultural Organisation, *United Nations Decade of Education,* p.31.

[93] Bell and Waters, *Doing Your Research Project,* pp. 212-214.

comprehensive solution for effective climate action. Participants need more training, experience, and knowledge to actively participate in climate action, according to both quantitative and qualitative data.

Moving forward, it is imperative to conduct further research to assess the long-term effects of similar workshops on participants' attitudes and behaviours. Additionally, the development of comprehensive educational strategies is crucial. These will empower individuals to effectively translate their heightened ecological consciousness, ability to identify with nature, and understanding of the living systems consciousness into concrete and sustained actions for environmental protection and sustainability. Future studies should strive to overcome the limitations of this research by incorporating larger and more diverse sample sizes. This would enhance the generalisability of the findings and provide a more comprehensive understanding of the potential impact of such workshops.

Furthermore, the comparison between being an insider and an outsider allowed for a more effective assessment of the workshop content and teaching methods. It became evident that the content and teaching approaches were effective in initiating a transformation in participants' attitudes and knowledge. However, it also highlighted the importance of subsequent workshops and the willingness of participants to continue learning and engaging with the content. Overall, this dual perspective points out the need for ongoing education and the cultivation of a supportive learning environment that encourages participants to continually expand their knowledge and skills. By acknowledging the significance of experience and providing opportunities for participants to further engage with the content, it becomes evident that the potential for transformative change and sustained behavioural shifts towards environmental consciousness can be realised.

To conclude, this dissertation contributes significantly to the field of environmental education by demonstrating the efficacy of workshops aimed at fostering connections with nature and promoting sustainable actions. Building upon the concept of ecological consciousness as conceptualised by Harrild and Luke,[94] this study underscores the potential of such workshops to cultivate an ecocentric perspective and deepen individuals' sense of interdependence with the natural world. Through the integration of theoretical and practical teaching methods, transdisciplinary approaches, and experiential learning, these workshops facilitate a valuable introduction to a comprehensive understanding of complex issues like

[94] Harrild and Luke, Transpersonal Ecopsychology, p.6.

climate change. The research findings highlight that these workshops have the capacity to increase awareness, inspire participants, nurture nature connections, and refine observational skills. However, it is important to acknowledge the limitations of expecting a single workshop to elicit significant climate action or induce transformative behavioural change.

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12. Appendices

12.1. Appendix Quantitative Questions

Antic Seeds, Natural Farming and Seed Balls Workshop Research Form

* Indicates required question

1. Email *

2. 1. What made you attend the workshop on antique seed, natural farming, and seedballs? 1 point

Tick all that apply.

- [ ] Archaeology
- [ ] Ecology and Natural farming
- [ ] Antique seeds
- [ ] Making seed balls
- [ ] Learning
- [ ] Teaching others
- [ ] Growing plants
- [ ] Other: _____

3. 2. Do you think climate crises motivated you to attend this workshop? * 1 point

Mark only one oval.

- ◯ Yes
- ◯ No

4. 3. What do you think is the purpose of the antique seed, natural farming, and seed balls workshop? 1 point

5. 4. How did taking part in the workshop affect you? 1 point

6. 5. What are the benefits you gained from participating in the workshop? * 1 point

Mark only one oval.

- ◯ Knowledge
- ◯ Hands-on education
- ◯ Socialising
- ◯ Learning new things
- ◯ Observing seeds grow
- ◯ Other: _____

7. 6. How does the experience of making a seed ball and growing it affect how you connect with nature? * 1 point

8. 7. Did you observe your seed ball growing? * 1 point

Mark only one oval.

- Yes
- No

9. 8. Did the workshop make you want to grow more plants? * 1 point

Mark only one oval.

- Yes
- No

10. 9. Have you attended any ecological movements, gardening activities or workshops like this since the workshop? * 1 point

Mark only one oval.

- Yes
- No

11. 10. Are you active in climate action? * 1 point

Mark only one oval.

- ◯ Yes
- ◯ No

12. 11. Did the workshop changed the way you think: If so how? 1 point

13. 12. Did learning the subject of farming issues of today by referencing ancient methods help you to understand climate change? * 1 point

Mark only one oval.

- ◯ Yes
- ◯ No

14. 13. How does this workshop promote learning with nature connectedness? * 1 point

15. 14. How do you think experience (making seedballs), Observing your seeds and knowledge transform a person's connection with nature? * 1 point

16. 15. Do you think the workshop changed anything on your awareness to nature? 1 point

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe
- ◯ Other: _____

17. 16. Is there anything you would like to comment about your experience? 1 point

18. 17. If you could not look after your seedball or watch it grow could you explain why? 1 point

12.2. Appendix Qualitative Questions

Antique Seeds, Natural Farming and Seedballs Workshop

Qualitative Research Questions

1. How do you think doing seedballs, using the hands-on method, affected you? Do you think hands-on learning has an effect on your learning experience?

2. If you only had a presentation and did not have hands on experience making or observing your seed ball, what do you think would be missing the purpose of the workshop?

3. Do you think the workshop changed anything in your behaviour towards nature? If yes, please give some examples.

4. Did you feel responsible for the growth of your seedball?

5. Do you think this workshop has had any behavioural, awareness changes in you about your actions in nature? If so, please give an example.

6. Do you think the workshop changed anything in your behaviour towards nature? If yes, please give some examples

7. Do you think this workshop changed anything in your consciousness?' If yes, please give an example