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Teachers' perspectives on using school food gardens as a third space for sustainable livelihoods education

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Abstract

Despite growing advocacy for sustainability education, limited empirical research has explored teachers' perspectives on the pedagogical use of school food gardens as structured learning spaces for sustainable livelihoods education. This study examined teachers' views on the use of school food gardens as a third space that connects formal curriculum knowledge with learners' lived experiences. Guided by a transformative paradigm, the study adopted a qualitative PALAR design. Six teachers from three schools in Hoedspruit, South Africa, participated in the study. Data were generated through photovoice, digital storytelling, and semi-structured interviews, and analysed thematically. The findings revealed that teachers conceptualised education for sustainable livelihoods as enabling employment creation, self-sufficiency, and meaningful contribution to home and community. School food gardens were perceived as transformative learning environments that support experiential and cross-disciplinary learning, ecological awareness, and practical skill development. These findings contribute to educational transformation by demonstrating how garden-based learning can reposition schools as sites of socio-economic empowerment and sustainability practice. The study recommends the formal integration of school food gardens into the curriculum, targeted teacher professional development, strengthened community partnerships, and equitable resourcing. The findings offer policy- and practice-relevant insights for embedding sustainability education within everyday teaching and learning in resource-constrained contexts.

Keywords: *education for sustainable development, experiential learning, school food gardens, sustainable livelihoods education, third space learning*

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1. Introduction

Education for sustainable livelihoods is increasingly recognized as a vital framework for fostering environmentally and socially responsible living. According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (2022), it equips learners with the knowledge, attitudes, and competencies necessary to build sustainable futures. Elegbede et al. (2023) echo this, highlighting the transformative impact of education in building resilience and sustainability. Sustainable livelihoods, as defined by Sati and Vangchhia (2017), encompass improved income, food security, reduced vulnerability, and efficient natural resource use. The integration of these principles in education is reinforced by the United Nations' 2030 Agenda and SDG 4, which emphasize quality education as a pathway to sustainability (Arduino et al., 2017). Thus, education for sustainable livelihoods plays a foundational role in promoting economic resilience, social justice, and ecological stewardship.

While global sustainability frameworks such as the United Nations' 2030 Agenda and Sustainable Development Goal 4 provide a universal vision for quality and inclusive education, their realisation is ultimately shaped by local socio-economic and educational contexts. In South Africa, persistent challenges including poverty, food insecurity, youth unemployment, and resource disparities continue to undermine learners' access to meaningful and relevant education. Within this context, schools are increasingly expected to respond not only to academic outcomes but also to learners' immediate livelihood needs. School food gardens therefore represent a locally grounded response to global sustainability imperatives, translating abstract global goals into practical, contextually relevant learning experiences. By embedding sustainability education within everyday school practices, food gardens enable learners to engage with global sustainability principles in ways that are responsive to their lived realities and community environments.

Beyond academics, education must prepare learners for life by fostering skills in food security, environmental stewardship, and economic self-sufficiency. UNESCO (2022) notes that education for sustainable development empowers learners to address challenges like environmental degradation and economic instability. Sustainable food systems not only address food security, poverty, and nutrition but also strengthen communities' capacity to withstand and recover from global environmental and socio-economic challenges (Bello et al., 2025). Shabalala (2019, 2024) adds that environmental literacy fosters active civic participation and informed decision-making, while Molaodi (2022) links sustainable education

to improved labor force quality and national economic growth. Practical initiatives such as school food gardens exemplify this approach. As Moswane (2018) states that gardens link theoretical learning with hands-on practice, enhancing ecological and nutritional literacy. Papadopoulou et al. (2020) and Taylor et al. (2019) also support the interdisciplinary nature of school gardens in fostering critical environmental thinking, proving their value in sustainable livelihood education.

Moreover, school food gardens serve as microeconomic and community development spaces. They create opportunities for learners to engage in entrepreneurship, social cohesion, and food production. Ncanywa et al. (2025) advocate for entrepreneurial learning in schools to drive sustainable development, while Kanosvamhira (2025) found that gardens enable learners to participate in collective food-growing and selling, building resilience. Sherry (2022) emphasizes that while not all learners may become farmers, gardens prepare them to sustain themselves and their communities during crises, such as lockdowns. These activities align with Mushonga et al.'s (2019) vision of community-based sustainability efforts that promote cooperative action and urban-rural development models rooted in resilience and localized production.

The Third Space theory further situates school food gardens as dynamic learning environments that connect formal curricula with learners' lived experiences. Bhabha (1994) introduced the concept of Third Space as a site for negotiating cultural identities, while Moje et al. (2004) applied it to education as a transformative bridge between home and school literacies. Teachers, according to Manoharan (2020) and Tuckey (2021), are central to facilitating this space, guiding learners in interdisciplinary, contextually relevant learning. Tatham-Fashanu (2023) and Ferrari et al. (2021) emphasize the importance of teacher agency in allowing learners autonomy in learning activities. However, Passy (2020) cautions that teacher reluctance may hinder the use of these spaces despite their proven benefits. In addressing challenges like poverty, food insecurity, and youth unemployment, school gardens, as highlighted by Austin (2022) and May et al. (2020), offer learners critical thinking skills and community support structures, proving their contextual relevance in sustainable education.

Despite growing global and local awareness of sustainability in education, the integration of practical tools such as school food gardens into formal curricula remains limited. In Australia, Sherry (2022) notes that food gardens are an underdeveloped resource in education, and similarly, Passy (2020) found that UK teachers observed improved

concentration and cognitive development in learners engaged in gardening projects. Gray et al. (2019) argue that food-growing activities support interdisciplinary learning and environmental awareness. López-Banet et al. (2022) further highlight learners' high motivation in garden-based activities, indicating opportunities to foster early interest in science and food-related skills. In South Africa, however, Buthelezi (2024) found that school gardens are primarily valued for food provision and fundraising, with limited curricular integration. Buthelezi advocates for intentional curricular planning that incorporates garden-based learning to enhance sustainability education. Furthermore, traditional classrooms often fail to equip learners with the practical skills and indigenous knowledge necessary for sustainable livelihoods. Carswell (2021) stresses the importance of including indigenous practices in teaching to support authentic learning. Taylor et al. (2019) affirm that school gardens provide spaces for critical engagement with environmental and health issues that are often unattainable in conventional classrooms.

Teachers' perspectives on using school food gardens as educational tools remain underexplored, especially regarding their potential as "third spaces" for learning. Corbacho-Cuello and Muñoz-Losa (2025) observed that teachers and school leaders recognized a link between gardening and academic achievement. Mbhenyane et al. (2022) conducted a broader study in South Africa, finding that about two-thirds of 683 surveyed teachers used food gardens for instructional purposes, particularly in Life Orientation (82%) and Natural Sciences (46%). Further research by Sanchez et al. (2025) revealed that among teachers viewed gardens as relevant for nutrition education, where learners are taught about healthy lifestyles and encouraged to grow their own food. These findings collectively suggest that while some teachers recognize the pedagogical value of school gardens, there remains significant potential to expand their use as tools for sustainability education across more disciplines.

While numerous studies emphasize the health and nutritional benefits of school food gardens, there remains a significant gap in the literature regarding their pedagogical use and potential to support sustainable livelihoods education. Research by Naicker et al. (2023) underscores the dominance of food security concerns over educational engagement in garden spaces, highlighting missed opportunities to foster life skills and sustainability mindsets among learners. Similarly, Sanchez et al. (2025) point to the environmental and practical skill-building benefits of gardens, but acknowledges systemic barriers such as lack of funding, inadequate teacher training, and poor planning as limitations to their educational use.

Kanosvamhira (2025) further emphasizes planning constraints in low-income contexts, suggesting that structural issues prevent gardens from being fully realized as educational tools. This body of work largely omits a deeper exploration of the pedagogical agency of teachers and their perspectives on using food gardens as teaching and learning spaces for sustainable livelihoods.

Additionally, prior research tends to focus on other stakeholders, such as principals (Jordaan, 2019), community members (Van der Westhuizen, 2019), and learners (Beery & Wolf-Watz, 2014). This focus often overlooks teachers as central actors in transforming school gardens into spaces for experiential, vocational, and livelihood-oriented education. Botha and Ferreira (2024) and Beery and Wolf-Watz (2014) advocate for experiential and community-based learning but do not explicitly explore how teachers conceptualize or implement such practices. This neglect occurs despite the growing emphasis on diversifying academic pathways in South Africa, with the Department of Basic Education (DBE, 2020) calling for the integration of vocational and occupational learning in schools. Teachers play a vital role in shaping these alternative learning experiences, especially through innovative, place-based pedagogies like school gardens. Therefore, it is crucial to explore teachers' perspectives on using school food gardens as a "third space", a hybrid space that blends formal and informal learning, for advancing education geared towards sustainable livelihoods.

Despite growing scholarly interest in education for sustainable livelihoods and the pedagogical value of school food gardens, existing research reveals several critical gaps that warrant further investigation. Much of the literature foregrounds the nutritional, health, and food security benefits of school food gardens, often positioning them primarily as welfare or support mechanisms rather than as intentional pedagogical spaces for learning. Where educational value is acknowledged, studies tend to emphasise learner outcomes or community benefits. Limited attention is given to the pedagogical agency of teachers, who are central to mediating, designing, and sustaining these learning environments. Furthermore, prior research frequently examines school gardens through single-disciplinary lenses, overlooking their potential as cross-disciplinary and integrative learning spaces aligned with sustainable livelihoods education. While Third Space theory has been applied broadly to understand hybrid learning environments, its application to school food gardens, particularly from teachers' perspectives remains underdeveloped. In the South African context, this gap is further compounded by a tendency to focus on principals, learners, or community stakeholders,

thereby marginalising teachers' lived experiences and professional insights into curriculum enactment within garden spaces. Consequently, there is limited empirical understanding of how teachers conceptualise the purpose of education in relation to sustainable livelihoods. There is also limited insight into how school food gardens are used as third spaces for learning and how these spaces are pedagogically mobilised within resource-constrained settings. Addressing these gaps, this study undertakes a teacher-centred, contextually grounded exploration of school food gardens as third spaces for sustainable livelihoods education. In doing so, it contributes to both theoretical understanding and educational practice.

This study aims to explore teachers' perspectives on the purpose of education in relation to sustainable livelihoods, with particular emphasis on how educators conceptualise education as a means of fostering self-sufficiency, employability, and community empowerment. It also determines teachers' experiences and perceptions of using the school food garden as a third space for learning, specifically in advancing sustainable livelihoods education through experiential, cross-disciplinary, and contextually relevant pedagogical practices.

2. Methodology

2.1. Research Design

This study employed the transformative research paradigm. A transformative paradigm was preferred for this study as a paradigm that focuses on the experiences of marginalized communities, examines power imbalances contributing to their marginalization, and connects research discovery efforts aimed at reducing inequalities (Jackson et al., 2018). Throughout the research process, the reality was constructed through the interactions and the use of participatory methodology in the evolution of the processes that are embedded within the people who implement such changes (Hudon et al., 2021). The research employs a qualitative transformative approach to facilitate a deeper exploration of teachers' perspectives on using school food gardens as a Third Space for Sustainable Livelihoods Education. Positioning this research within a transformative research paradigm helped to explain methodological choices and contextualize the validity of research findings.

This study employed Participatory Action Learning and Action Research (PALAR) research design, which aims to research with people, not on people (Zuber-Skerrit, 2015). PALAR prioritizes research through partnerships between researchers and stakeholders,

community members, or others with insider knowledge and lived expertise (Zuber-Skerritt & Wood, 2020). A PALAR research design was employed for this study, which entailed collaboration between university researchers and teachers. PALAR is "transformational in purpose, process and outcome" (Zuber-Skerritt, 2015, p. 2), with the capacity to reflect and create new "ways of thinking and understanding the world." It also enables collaborative inquiry into "wicked" problems, going beyond the limits of human perception shaped by formal learning instruction. The design was selected to uncover teachers' perspectives on using school food gardens as a Third Space, including innovative ways to improve the curriculum.

2.2. Participants of the Study

The target population of this study consisted of teachers in Hoedspruit schools who use school food gardens as a third space for learning. A purposive sampling technique was employed to select participants who met the inclusion criteria. Purposeful sampling is selecting research participants where specific individuals or groups are deliberately chosen based on predefined criteria to achieve a particular purpose or objective (Bouncken et al., 2025). Participants should have firsthand knowledge of the phenomenon being studied, have participated in, or have been exposed to teaching using the school food garden as a third space for learning. In total, six teachers who used the school food garden as a third space for learning were selected for this study. The teachers were chosen because they were actively participating in the garden and also their interest and connection to the garden. The participants were chosen to provide their perspectives on teachers' perspectives on using school food gardens as a third space for sustainable livelihoods education. The six participants included senior teachers, SMT members, CS1 teachers, and a Head of Foundation Phase, teaching subjects ranging from Agricultural Management, Agricultural Sciences, and Life Sciences to History, Life Skills, and Natural Sciences across grades 2 to 12.

The researcher secured written informed consent from all participants. Participants were advised that their participation was voluntary and that they could withdraw from the study at any stage without any negative consequences. The researcher handled all data provided by participants with strict confidentiality, and anonymity was ensured through the use of pseudonyms for both participants and their schools. Privacy was further protected to maintain the dignity, rights, and interests of the participants and their schools.

2.3. Instrumentation and Data Gathering Process

To collect data, photo-voices, digital stories, and semi-structured interviews were conducted with the selected participants. As a research data collection instrument, photo-voice involves participants capturing images based on specific prompts and engaging in group discussions to analyse these photographs (Anderson et al., 2023). In the photovoice process, participants used cell phones to document how they integrated the school food garden and other outdoor spaces into curriculum repurposing for sustainable livelihoods, capturing photographs of areas where learning extended beyond the classroom. These images were presented during meetings and served as prompts for discussion on how outdoor spaces shaped school culture and supported teaching and learning. Digital storytelling involves creating and sharing multimedia narratives using digital tools, presenting a versatile instrument for data collection with varying techniques depending on the platform, purpose, and audience (Kato Naribye, 2025). Teachers used the CAPS and national curriculum to identify garden-based teaching topics, visually documenting lesson plans and sharing them via a WhatsApp group, followed by video recordings of garden lessons that were submitted to the researcher for transcription.

The digital stories were followed by a semi-structured interview, which encouraged participants to elaborate on their perspectives on using a school food garden as a third space for learning. Based on data from the digital stories and photovoice, the researcher developed a set of five interview questions. These questions focused on the purpose of education for sustainable livelihoods, teachers' perspectives on school food gardens as third spaces for learning, their role in leading curriculum repurposing through gardens, and the successes and challenges they experienced in this process. This approach enabled the researcher to capture a deeper understanding and explore emerging themes while maintaining a structured framework (Melissa & Lisa, 2019).

As soon as the digital stories and the photo-voice presentations were completed, all the video recordings were manually transcribed verbatim to allow for deeper engagement with the data. The interview was conducted at the most convenient time that suited each participant. For some participants, interviews were conducted after school hours for them to honour their teaching time at the school.

2.4. Data Analysis

According to Zuber-Skerritt (2018), within the PALAR framework, data analysis is a continuous and iterative process. Data collection and analysis are interlinked in each cycle, with reflection integrated into every session. A comprehensive analysis of the data was made possible by this cyclical technique, which also made it easier to spot and decipher themes, patterns, and underlying meanings in the participants' answers. Together with lesson planning materials and observational notes, data gathered via photovoice, digital storytelling, and semi-structured interviews were transcribed and subjected to thematic analysis. Thematic analysis, as described by Creswell and Creswell (2017), involves systematically reading qualitative data to identify recurring patterns and emergent themes.

After completing the digital stories and photovoice presentations, all were transcribed verbatim by hand to facilitate deeper engagement with the data. Following the guidelines by Creswell and Creswell (2017), two close readings of the transcripts were conducted to ensure thorough familiarity with the participants' narratives and insights. A discussion of themes together with their respective sub-themes followed. The qualitative data were analysed using thematic analysis following Braun and Clarke's (2006) six-phase framework, which included data familiarisation, manual coding, theme development and refinement, and the final reporting. Reflexivity was central to the study, with the researcher critically examining personal assumptions and positionality to minimise bias and ensure interpretations remained grounded in participants' perspectives (Creswell & Creswell, 2017).

To further minimise researcher bias and enhance the credibility of the findings, several reflexive and methodological strategies were employed throughout the research process. The researcher engaged in ongoing reflexivity by critically reflecting on personal assumptions, positionality, and prior experiences related to sustainability education and school-based interventions. Reflexive notes were maintained during data collection and analysis to ensure that interpretations remained grounded in participants' voices rather than the researcher's preconceptions. This reflexive practice supported analytical transparency and reduced the likelihood of subjective distortion of the data. In addition, data triangulation was used as a key strategy to strengthen trustworthiness. Multiple data sources, photovoice artefacts, digital stories, semi-structured interview transcripts, lesson planning materials, and observational notes, were systematically compared to corroborate emerging themes and interpretations. The convergence of evidence across these diverse data collection methods enhanced the credibility

and dependability of the findings, as recurring patterns were validated through multiple forms of participant-generated data. Triangulation therefore ensured that the findings were not reliant on a single data source or method, but reflected a coherent and consistent representation of teachers' perspectives.

2.5. Research Ethics

This study adhered to strict ethical standards. All individuals provided informed consent before participation, acknowledging their voluntary involvement and right to withdraw without consequence. The research received approval from the University of Johannesburg's Faculty of Education Research Ethics Committee, under clearance number Ethical Clearance Number: Sem 1-2023-084, ensuring the protection of participants' rights and well-being.

3. Findings and Discussion

Table 1 shows the summary outlining the themes and sub-themes.

Table 1

Themes and sub-themes

Themes	Sub-themes
The purpose of education in relation to sustainable livelihoods	Education that leads to employment and job creation Education that results in being self-sufficient Education as empowerment and in service to home and community
The use of the school food garden as a third space for learning	School garden legacy as an Environment for lifelong learning Cross-disciplinary learning Securing a future through the environment Hands-on learning environment

Theme 1: Purpose of Education in Relation to Sustainable Livelihoods

Education that leads to employment and job creation. The data highlights participants' perspectives on the purpose of education as a means to foster sustainable livelihoods through employment and job creation. Participants emphasized that education should not only equip learners with knowledge but also empower them with practical skills that translate into employability and entrepreneurial capabilities. Participant Five expressed a strong belief in the role of education in promoting self-reliance and economic empowerment.

They underscored the importance of education that enables individuals to become productive and contribute to job creation in their communities: "*This is our vision, and …even if you are working and you are producing more, you are able to employ and create jobs for other people*". In a related comment, Participant Two elaborated on the transformative nature of education for sustainable livelihoods, emphasizing the need for schooling to respond directly to the challenge of youth unemployment: "*We want to impart the skills; when the learners leave the school, they are not supposed to be unemployed*". These insights illustrate a call for an education system that is closely aligned with economic realities, aiming to empower learners with the capacity to either gain employment or become job creators, thereby contributing to sustainable community development.

Participants' emphasis on self-reliance and economic empowerment reflects a widely held belief that education should be linked to productive outcomes. The view that learners should leave school with relevant skills that prepare them for employment or entrepreneurship supports Sen's (1999) concept of capability expansion, where education enhances individual freedoms and opportunities, including the ability to secure a livelihood. The participant's assertion that learners "are not supposed to be unemployed" upon completing school highlights a critique of traditional education models that prioritize academic content over practical, market-driven skills. This aligns with UNESCO (2022), which advocates for education systems to adopt a more skills-based approach to meet the needs of evolving labour markets. It also reflects the goals of Education for Sustainable Development (ESD), which encourages learning that equips individuals with the knowledge and skills needed to promote inclusive and sustainable economic growth.

Furthermore, the emphasis on job creation situates education as a driver of entrepreneurship, particularly relevant in contexts where formal employment opportunities are scarce. According to Zylfijaj and Shaqiri (2023)**,** technical and vocational education and training can play a pivotal role in bridging the gap between education and employment, especially in developing economies. Participants' comments reinforce this idea, suggesting that education should prepare learners not only to seek jobs but also to become creators of employment for others, thereby contributing to broader community upliftment and local economic development. Participants' comments suggest that education should prepare learners to create jobs, not just seek them, contributing to community upliftment and local economic development. This aligns with the notion of sustainable livelihoods, which Natarajan et al.

(2022) define as capabilities, assets, and activities required for a means of living that can cope with and recover from stresses and shocks. Education, when effectively designed and implemented, can provide individuals with the human capital needed to access such livelihoods.

Similar initiatives in countries such as Kenya, India, and Brazil demonstrate how school-based agricultural and livelihood programmes have been used to address youth unemployment and promote entrepreneurship through practical, skills-oriented education. For example, studies from Kenya show that integrating school gardens with vocational training enhances learners' transition into agribusiness and self-employment, particularly in rural contexts (Muchira, 2018). In Brazil, school garden programmes linked to national school feeding schemes have been shown to stimulate local economic activity and youth-led micro-enterprises (Silva et al., 2023). These international examples reinforce the participants' view that education should not merely prepare learners for formal employment but should also cultivate entrepreneurial capabilities and job creation skills. The alignment between the present findings and global initiatives suggests that school food gardens can serve as scalable models for livelihood-oriented education, particularly in contexts characterised by high youth unemployment.

Education that results in being self-sufficient. The participants reflect on the role of education in equipping learners with practical skills that promote self-reliance and sustainable living. Participants emphasized the importance of integrating livelihood skills, such as gardening, into the educational experience to ensure that learners and community members can sustain themselves, especially in resource-constrained environments. Participant One highlighted the importance of home gardening as a means for community members to become less dependent on purchasing food. They stated: "*Each and every community member, if they can have a smaller piece of garden at home, [they will be able] to feed their children at home, not to buy each and every little thing*". Expanding on the developmental role of gardening, Participant Three explained how such practices could empower learners to contribute to community development and personal sustainability: "*All this starts at the garden. We develop the community; we want the learners to end up being somewhere where they will be able to create their own sustainable livelihoods. Even if learners are not working, they can be able to devise a means of making food through gardening skills*". Further reinforcing this view,

Participant One emphasized the broader educational aim of preparing learners to address basic needs such as food security: "*We want the learners to have plans to put food on the table*.

The data highlights a crucial reimagining of the purpose of education, one that transcends traditional academic outcomes to include equipping learners with practical skills essential for sustainable living. The participants' perspectives resonate with a growing body of literature that advocates for education systems that empower individuals to create and sustain their own livelihoods, especially in resource-constrained and disadvantaged communities. The emphasis on gardening as a foundational livelihood skill aligns with the principles of the Sustainable Livelihoods Framework (SLF) developed by Natarajan et al. (2022). The SLF identifies human capital, such as skills, knowledge, and education, as a key asset that individuals use to pursue sustainable livelihoods. Participant One's reflections illustrate how education that incorporates practical components like gardening enhances this human capital, enabling learners not only to address immediate food security but also to contribute to community development. This vision of education is supported by UNESCO (2022), which asserts that education for sustainable development (ESD) must integrate knowledge and skills that prepare learners for real-life challenges, such as environmental sustainability and economic independence. Teaching learners gardening skills fosters resilience and adaptability amid socio-economic uncertainties, underscoring the need to shift from transmissive to transformative approaches in sustainable education (Kanosvamhira et al., 2024). Participants' assertion reflects a transformative vision, where education empowers learners to meet basic needs, reduce dependency, and promote agency. In contexts marked by unemployment and poverty, such skills become vital for survival. Leao and Goulao (2024) similarly emphasized the need for schooling in rural and disadvantaged contexts to align with learners' socio-economic realities. They advocate for school-based projects, such as permaculture and food gardens, to support both learning and sustenance. Furthermore, the idea that "all this starts at the garden" symbolizes a grassroots approach to development through education. This aligns with Freire's (1970) humanizing pedagogy, which emphasizes education that is rooted in learners' lived realities and aims to transform their social conditions. In this case, the act of gardening is not merely a skill, but a pedagogical tool that connects learners to their communities and equips them to be active agents of change.

Comparable studies from Nepal, Bangladesh, and Ethiopia illustrate how school gardening initiatives contribute to household food security and learner self-reliance, especially

in low-income and agrarian communities. For instance, research in Nepal indicates that learners who acquire gardening skills at school are more likely to establish home gardens, thereby reducing household food expenditure and improving nutritional outcomes (Bhattarai, 2024). Similarly, programmes in Bangladesh demonstrate that school gardens function as entry points for teaching low-cost, sustainable agricultural practices that enhance community resilience (Baliki, et al., 2022). These findings resonate strongly with participants' emphasis on gardening as a means of ensuring food security and reducing dependency. By linking the local findings to these international experiences, the study underscores the global relevance of school food gardens as tools for fostering self-sufficiency and sustainable livelihoods.

Education as empowerment and in service to home and community. This theme captures how education, particularly agricultural education, is viewed by educators as a tool for empowering learners to support themselves and their communities. Participants emphasized the importance of equipping learners with practical skills that extend beyond the classroom and contribute to food security, economic self-reliance, and community well-being. From the interviews, Participant One highlighted the broader vision of education as a means to serve both learners and their communities: "*It is our vision … to assist all our learners, and the learners to be able to assist the community at large*". Participant Two shared how learners begin to apply their agricultural knowledge in their personal spaces, demonstrating self-reliance: "…*They (learners) even just because of the skill, they even manage to do their own garden that is small scale at their home*". Similarly, Participant Five explained how learners in senior grades become agents of change by cultivating, consuming, selling, and donating produce: "…*when the learners are in grade 12 or grade 11, they can make their own vegetable garden at home… and they can harvest 'marogo', they can sell 'marogo', they can eat 'marogo', and they can give to the needy people*". From the digital stories, Participant One observed the positive outcomes of learners transferring their school-based agricultural practices to their households: "…*some of our learners, they are practicing this mandala garden at their homes, and their homes are benefitting because they are now eating their healthy food, healthy vegetables fresh from the garden*". Lastly, Participant Two in the digital stories noted the internal motivation learners develop, which encourages them to establish home gardens: "…*They are able to start their own gardens at home because they gained love for farming*".

The data strongly aligns with the conceptual framing of education as a tool not only for individual development but also for collective, sustainable community transformation. This vision positions education, particularly agricultural education, as a foundation for sustainable livelihoods. United Nations Development Programme (UNDP) defines as activities required for a means of living that can handle and bounce back from shocks and strains while preserving or improving capabilities and assets both now and in the future (Pour et al., 2018). Participants' narratives provide compelling evidence of how education is being used practically and contextually to empower learners and strengthen their ties to home and community. For instance, Participant One's assertion that the school's vision is to enable learners to assist the community illustrates Freire's (1970) concept of education as a practice of freedom, where learners become conscious agents capable of transforming their realities. This reflects an emancipatory pedagogy, in which education equips individuals with the knowledge and skills necessary to address social, economic, and environmental challenges within their contexts. The testimonies of learners applying agricultural knowledge to create home gardens, as expressed by Participants Two and Participant Five, demonstrate education's direct impact on food security, a core component of sustainable livelihoods. These home-based gardens become sources of nutrition, income, and even generosity (as learners share produce with those in need). Such outcomes underscore Desmarais (2024) view that education should develop ecological literacy, an understanding of how people relate to and can live sustainably within ecosystems. Furthermore, this experiential learning approach supports the pedagogy of relevance, which Steger et al. (2021) argue is essential for learners to find meaning in their studies. Agricultural practices taught in schools become real-life applications that allow students not just to consume knowledge, but to act on it, turning theory into praxis. In doing so, learners enhance their agency, a critical element in the Sustainable Livelihoods Framework by He and Ahmed (2022) and Natarajan et al. (2022), which emphasizes the importance of human capital in building resilience. Participant One's observation of learners implementing mandala gardens at home further points to transformational learning, where internal change leads to new behaviors and improved life conditions. According to Mezirow (2018), such transformation occurs when individuals critically reflect on their assumptions and engage in learning that is deeply rooted in context and practice.

Internationally, school gardens in Cuba and Zimbabwe have been documented as community empowerment spaces where learners transfer agricultural knowledge to

households, strengthening food sovereignty and social cohesion (Altieri & Nicholls, 2020; Farag et al., 2021). These global cases mirror the findings of this study, where learners applied gardening skills at home, shared produce with community members, and contributed to local food systems. The comparative perspective highlights that education grounded in practical, place-based learning consistently functions as a mechanism for empowerment across diverse socio-economic contexts. This reinforces the argument that school food gardens operate not only as educational tools but also as catalysts for community development and collective well-being.

Theme 2: The Use of the School Food Garden as a Third Space for Learning

School garden legacy as an Environment for lifelong learning. Participants viewed the school food garden not only as an educational resource but also as a lasting symbol of sustainability and community well-being. The garden served as a "third space" for learning, beyond the classroom and home, where learners developed life skills such as food production, environmental awareness, and health consciousness. The school garden was seen as a living legacy that continues to inspire learning even after students leave school. Photovoice Participant Four emphasized the vital role of gardens in sustaining life and promoting well-being. They stated: *"…a community without a garden or a home without a garden has no life. Not only a life but a healthy life"*. Photovoice Participant One shared the communal enthusiasm and the ongoing legacy of the garden, highlighting its role in sustaining practices like permaculture: *"…So, everyone at school was excited about the garden…we were all happy about the garden …the garden will remain existing and we do permaculture gardening"*. Photovoice Participant Five noted how the influence of the school garden extended to the learners' homes and broader community, fostering a culture of gardening beyond the school context: *"…In the village, I am living Finale; many learners are having gardens in their homes"*.

The data presentation clearly illustrates how the school food garden functioned as more than just an academic project; it emerged as a third space for learning and a legacy of sustainability that fosters lifelong learning, both within and beyond the school context. The concept of the "third space" originates from cultural theorist Bhabha (1994), who described it as a hybrid space where new meanings and practices can be negotiated beyond the binaries of home and school. In educational settings, third spaces offer environments where formal and

informal learning converge. A school food garden, as described by the participants, becomes such a third space by enabling experiential, holistic, and contextually relevant learning that extends into daily life. This aligns with Moyer and Sinclair's (2020) findings, which emphasize how school gardens can be used as “transformative learning spaces” that foster youth empowerment, critical thinking, and ecological stewardship. Participant Four, for example, reflected a deep understanding of the relationship between gardening, health, and sustainability, asserting that a home without a garden has no life. This statement speaks to the embedded life skills and value systems cultivated through engagement with the garden.

The participants’ testimonies reveal that the garden’s influence endures beyond the immediate school setting. As Participant Five noted, the garden culture transferred to learners' homes and the broader village community, supporting lifelong and life-wide learning. This observation supports the idea of education for sustainable development, which seeks to equip learners with the knowledge, skills, and values necessary to build sustainable futures (Agbedahin, 2019). According to Pollin and Retzlaff-Fürst (2021), school gardens also serve as sites of emotional and cultural learning, reinforcing values of cooperation, care, and environmental stewardship. The excitement and pride shared by Participant One regarding the continuation of permaculture gardening demonstrate how the school garden fosters not only technical skills but also a sense of identity and community belonging. The extension of gardening practices into homes and communities illustrates the ripple effect of school-based environmental learning. This mirrors findings from Kanosvamhira et al (2024) who emphasize how school gardens can influence household practices, improve food security, and inspire community resilience. The learners’ transference of skills from the school garden to their homes shows the potential of school gardens as agents of intergenerational and community-based learning.

Research from Germany, Australia, and the United States demonstrates that school gardens often leave enduring legacies by shaping learners’ long-term attitudes towards sustainability, health, and environmental stewardship (Blair et al., 2021; Walshe, 2024). In Australia, for example, school gardens have been shown to influence learners’ adult lifestyle choices, including continued food growing and environmental activism (Sherry, 2022). These international findings closely align with participants’ observations that school gardens inspire practices that extend beyond schooling into homes and communities. This comparison

strengthens the argument that school food gardens function as enduring third spaces that support lifelong and life-wide learning globally, not only within the South African context.

Securing a future through the environment. This theme captures how participants viewed the school food garden not only as a practical learning space but also as a means to empower learners economically and environmentally. The garden is seen as a platform to equip learners with skills that can secure their future beyond the classroom, particularly in contexts of limited economic opportunity. Participant Five emphasized that many learners already apply environmental knowledge at home and that these skills could become income-generating opportunities. They noted: "*Most of the learners in our school, they have their own compost in their home in their gardens, they practice this. If a learner cannot further their studies, or maybe there is no work for them to do, the learners can make compost and sell it*". Expanding on this, Participant Five further reflected on the practical value of compost-making skills taught through the school food garden, stating: "*That when our learners, the grade 7 learners, when they go home, with or without the certificate, they know how to make compost without using money*". Participant Four highlighted the transformative potential of the garden experience in shaping learners' socio-economic perspectives. She shared: "*Once you take them to the garden, they start to see life around themselves... They can start to think about emancipating or empowering their socio-economic life by starting their own farms*".

This data presentation shows that participants viewed the school food garden not only as a pedagogical tool but also as a pathway to environmental awareness and socio-economic empowerment, particularly in disadvantaged contexts. The school food garden, in this context, represents what Tatham (2025) conceptualize as a third space, a transformative learning zone where the boundaries between formal schooling and learners' home/community lives blur. This space enables students to apply classroom knowledge in tangible, context-relevant ways. It supports what Ratnam (2020) describes as learning through repertoires of practice where learners navigate multiple cultural and knowledge systems, develop critical thinking (Smith, 2019), and engage in inquiry-based learning. The garden facilitates engagement in environmental sustainability practices like composting, gardening, and food production, which not only reinforce classroom lessons but also build critical life skills. The participants' comments reveal that learners engage with sustainability practices such as compost-making and home gardening, which they begin to replicate in their own homes. For example,

Participant Five's reflection illustrates how ecological knowledge can translate into economic agency. This aligns with Cocu et al. (2025), who argue that environmental education can be a driver of rural entrepreneurship and green jobs, especially when introduced at a young age. The reference to Grade 7 learners knowing how to make compost without using money reinforces the idea of resourcefulness and low-cost sustainability, which is vital in economically constrained communities. These skills enable learners to create value from waste, which is central to circular economy principles (Trevisan et al., 2025). Participant Four's contribution suggests the garden enables critical consciousness, a concept articulated by Freire (1970). Through experiential learning, students begin to envision how they might challenge and reshape their socio-economic conditions, making the garden a site of both learning and liberation.

A global environmental and economic perspective was integrated into this sub-theme. Comparable initiatives in Rwanda and Vietnam illustrate how school-based environmental education equips learners with green skills, such as composting and sustainable farming, which later translate into income-generating activities and green entrepreneurship (Kabera & Mutavu, 2023). These global cases reinforce the study's findings that environmental learning through school gardens fosters both ecological awareness and economic agency. By situating learners' composting and gardening skills within international green economy discourses, the discussion highlights that school food gardens contribute to future-oriented education aligned with global sustainability and climate resilience agendas.

Cross-disciplinary learning. The school food garden emerged as a valuable third space for promoting cross-disciplinary learning across subjects such as Technology, Natural Sciences, and Life Orientation. Participants shared how the garden was utilized to make classroom learning more practical and meaningful by linking theoretical concepts to real-life applications in the garden setting. For instance, Participant Five, a Technology teacher, described how the garden was used to reinforce the concept of structural design covered in the curriculum. The participant explained: "*...In Technology, as the structure, so that the learners can know what the structure is. They can see the living structure in the garden*".

The use of the garden to teach structural design in Technology, where learners observed and engaged with physical structures like trellises, compost bins, or garden beds, demonstrates the utility of experiential learning. This supports Kolb (2014), experiential learning theory,

which posits that knowledge is created through the transformation of experience. In this case, the garden acts as an interactive space where theoretical concepts are reinforced through hands-on engagement. This approach is also aligned with the concept of cross-disciplinary learning, which encourages the integration of content and skills from multiple subjects to develop a more holistic understanding of concepts (Priaulx & Weinel, 2018). For instance, structural principles taught in Technology can be contextualized using the garden structures, while Natural Sciences lessons on plant biology or ecosystems are enriched by real-time observation and experimentation in the garden environment. Life Orientation, on the other hand, finds relevance through themes such as nutrition, health, and environmental responsibility, all of which can be practically explored in the garden. Furthermore, using the school food garden to promote cross-disciplinary learning contributes to learner-centered and constructivist pedagogies (Vygotsky, 1978), where students construct knowledge through meaningful experiences. The integration of different subjects in a real-world context encourages higher-order thinking, problem-solving, and collaborative learning, fostering skills essential for the 21st century.

The cross-disciplinary value of school gardens was further strengthened through international comparisons. Studies from Finland, the United Kingdom, and Canada demonstrate that school gardens effectively integrate science, technology, health, and social studies through experiential, problem-based learning (Cairns, 2017). In the UK, garden-based learning has been shown to enhance conceptual understanding in science and technology by providing tangible contexts for abstract concepts, similar to the findings in this study. These global examples support the argument that school food gardens function as effective interdisciplinary platforms across diverse education systems, reinforcing their pedagogical legitimacy.

Hands-on learning environment. The school food garden was described by participants as a valuable that promotes experiential, hands-on education. Teachers emphasized that the garden enhances learners' understanding of theoretical content by allowing them to interact with concepts in a real-life context. Participant One highlighted the significance of the garden in creating a complete learning environment, suggesting that its absence diminishes the educational experience. Participant One explained: *"We understood that the school without a garden … something that is missing at the school".* Similarly,

participant Participant Four reflected on the limitations of purely theoretical instruction, stressing the importance of practical engagement in helping learners make meaningful connections: *"…Just sharing with them (learners) an information theoretically. The learners can't see how important in real life situation the information is"*. Participant Five further underscored the value of tactile and sensory learning experiences, noting that such engagement deepens learners' understanding and memory of content: *"…They will not forget the lesson, they will think they know it, they have touched it, they have feeled it, and when they talk about green leaves they will not forget what green is"*. These perspectives collectively demonstrate that the school food garden functions as a hands-on learning environment where learners can apply theoretical knowledge in meaningful and memorable ways.

In this study, the school food garden emerges as a powerful third space that enables learners to integrate classroom theory with lived experiences. As Participant One notes, the absence of the garden would create a void in the learning environment, indicating its central role in enriching educational experiences. Experiential learning theory Kolb (2014) supports this notion by emphasizing that knowledge is created through the transformation of experience. Learners grasp and internalize concepts more effectively when they are actively involved in doing, touching, and observing, a theme strongly echoed by Participant Four and Participant Five. Participant Four critiques purely theoretical instruction as inadequate, noting that learners often fail to see its relevance to real life. Participant Five reinforces this by illustrating how tactile and sensory involvement, such as touching green leaves, enhances memory retention and understanding. Hands-on learning in school gardens also aligns with constructivist educational paradigms, which argue that learners construct knowledge through interaction with their environment (Vygotsky, 1978). The garden provides such a setting, allowing learners to co-construct meaning through inquiry, experimentation, and direct experience. A study by Walshe et al. (2024) similarly found that school gardens promote student engagement, improve academic performance, and foster environmental stewardship, outcomes rooted in hands-on, experiential learning. Furthermore, food gardens contribute to developing critical life skills, including responsibility, teamwork, and problem-solving, while fostering a sense of ownership and agency in learners (Acharya et al., 2024; Nkomo, 2023). These outcomes are particularly valuable in contexts where learners may be disengaged from traditional classroom practices.

Global evidence from outdoor education programmes in Norway, Canada and New Zealand confirms that hands-on learning environments significantly improve learner

engagement, retention, and conceptual understanding (Kazi, 2022; Waite, 2022). These findings align closely with participants' emphasis on tactile and sensory engagement in the garden, demonstrating that experiential learning benefits observed in this study reflect a broader international pattern. The comparison strengthens the claim that school food gardens offer pedagogically robust learning environments recognised globally for their educational value.

4. Conclusion

This study has demonstrated that school food gardens function as dynamic and transformative third spaces for sustainable livelihoods education. From teachers' perspectives, the garden extends beyond an agricultural initiative to become a pedagogical site where learners engage in meaningful, context-based, and hands-on learning experiences that connect academic knowledge with real-world application. Through participation in school food gardens, learners acquire practical skills that support employment, entrepreneurship, self-sufficiency, and community resilience, which are central to sustainable livelihoods. The findings further highlight how gardens promote lifelong and life-wide learning, ecological awareness, cross-disciplinary engagement, and critical thinking, thereby contributing to learners' holistic development.

Importantly, the findings carry significant implications for education policy development. The study underscores the need for education policies, particularly within the Department of Basic Education, to formally recognise school food gardens as legitimate pedagogical spaces rather than peripheral or extracurricular activities. Policy frameworks that institutionalise school food gardens as part of education for sustainable development can enhance the relevance, inclusivity, and socio-economic responsiveness of schooling, especially in resource-constrained contexts. In terms of curriculum integration, the findings indicate that school food gardens offer practical opportunities to operationalise cross-disciplinary learning across subjects such as Natural Sciences, Life Orientation, Technology, and Geography. Integrating garden-based learning into the formal curriculum would enable learners to apply theoretical concepts through experiential, inquiry-based activities, thereby strengthening curriculum relevance and coherence. Such integration would also support national priorities related to sustainability, food security, and skills development.

The study further highlights the critical role of teacher training and professional development in sustaining the effective use of school food gardens. Teachers require targeted training in sustainability education, experiential pedagogy, and curriculum repurposing to confidently and creatively utilise gardens as third spaces for learning. Strengthening pre-service and in-service teacher education in these areas would enhance teacher agency, reduce reliance on individual initiative, and support the systematic implementation of garden-based learning across schools. Thus, school food gardens represent a powerful educational resource with the potential to bridge policy intentions, curriculum practice, and teacher pedagogy in ways that promote sustainable livelihoods education. By aligning education policy, curriculum design, and teacher training with the pedagogical potential of school food gardens, education systems can more effectively respond to socio-economic inequality, food insecurity, and environmental challenges. Institutionalising and resourcing school food gardens therefore offers a practical pathway for reimagining education as empowering, contextually relevant, and socially responsive.

5. Recommendations

Based on the findings presented in this study, the following recommendations are proposed:

Policy recommendations. At policy level, it is recommended that the Department of Basic Education formally institutionalise school food gardens as integral pedagogical spaces within the national curriculum. This integration should extend beyond food security initiatives and explicitly position gardens as curriculum-linked third spaces for education for sustainable livelihoods. Policy frameworks should support cross-curricular implementation across subjects such as Natural Sciences, Life Orientation, Technology, Geography, and Agricultural Sciences. Importantly, policy should prioritise sustained capacity-building for teachers through structured, sustainability-focused professional development programmes, equipping educators with the pedagogical, ecological, and practical competencies required to integrate garden-based learning meaningfully. Such professional development should be ongoing rather than once-off and aligned with Education for Sustainable Development principles. In addition, targeted funding and resource allocation policies should be introduced to support under-resourced schools, ensuring equitable access to infrastructure, tools, and training necessary for the long-term sustainability of school garden initiatives.

School and teacher practice recommendations. At school level, leadership teams should recognise school food gardens as legitimate learning environments rather than peripheral or extracurricular projects. Schools are encouraged to embed garden-based learning within teaching plans and assessment practices, promoting experiential, inquiry-based, and cross-disciplinary pedagogy. Teachers should be supported through continuous professional development that foregrounds sustainability education, experiential learning, and contextual pedagogy, enabling them to confidently facilitate learning in garden spaces. Furthermore, schools should actively pursue collaboration with local agriculture departments, non-governmental organisations, community-based organisations, and local farmers to strengthen technical support, resource mobilisation, and knowledge exchange. Such partnerships can enhance the sustainability of garden projects, provide mentorship opportunities, and connect learners with real-world agricultural and environmental practices. Community involvement should be encouraged through workshops, shared harvesting initiatives, and skills-transfer activities, positioning the school garden as a hub for community learning and sustainable livelihoods development.

Future research recommendations. Future research should extend this study by exploring the long-term educational, socio-economic, and environmental impacts of school food gardens across diverse contexts. Further studies could examine the effectiveness of sustainability-focused teacher professional development programmes in strengthening pedagogical use of school gardens. Comparative research across rural, peri-urban, and urban schools would provide deeper insight into contextual variations and scalability. Additionally, longitudinal studies involving learners, teachers, and community stakeholders are recommended to assess how school food gardens contribute to sustainable livelihoods, ecological literacy, and community resilience over time.

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Institutional Review Board Statement

This study was conducted in accordance with the ethical guidelines set by the University of Johannesburg. The conduct of this study has been approved and given relative clearance(s) by the Faculty of Education Research Ethics Committee.

AI Declaration

The author declares the use of Artificial Intelligence (AI) in writing this paper. In particular, the author used QuillBot in paraphrasing ideas and Grammarly in correcting grammatical errors. The authors take full responsibility for ensuring proper review and editing of content generated using AI.

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