Advancing Food Literacy in Technology and Livelihood Education through Community-Based Partnerships: A Mixed-Methods Evaluation

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ABSTRACT

This study examines how community-based partnerships enhance food literacy among Filipino secondary students enrolled in the Technology and Livelihood Education (TLE) curriculum. Using a convergent mixed-methods design, quantitative surveys (n = 120) and in-depth interviews with TLE educators (n = 15) and community stakeholders (n = 20) were conducted. Statistically significant gains were observed in all domains, including a 38.0% increase in overall food literacy and a 51.9% improvement in cooking competence. Community engagement frequency was positively correlated with cooking confidence (r = 0.56, $p < .001$) and food decision-making (r = 0.48, $p < .001$). Thematic analysis underscored the role of experiential learning, cultural continuity, and intergenerational knowledge. Respondents highlighted learner autonomy and food citizenship, while also citing institutional and logistical barriers. Positioned within the Sustainable Development Goals (4 and 12) and the Philippine MATATAG reform agenda, this study advocates for the formal integration of community-based food literacy programs in national education policy.

Keywords: Food literacy; Technology and Livelihood Education; community-based learning; experiential pedagogy; sustainable education

INTRODUCTION

The global call to improve food literacy has grown increasingly urgent, as communities face overlapping challenges related to nutrition, environmental sustainability, and the practicalities of food education (Vidgen & Gallegos, 2014; Renwick & Powell, 2022). In the Philippines, the Technology and Livelihood Education (TLE) curriculum is a core component of secondary education. It is designed to develop essential life skills among learners, including food preparation, meal planning, and informed decision-making on food consumption (Department of Education–Philippines, 2025; Cortez, 2025).

Despite the curriculum's intentions, the translation of theoretical knowledge into lived, culturally grounded food practices remains a persistent challenge—particularly in public school settings where access to community resources and contextualized learning opportunities is limited (Slater, 2013; Monday, 2024). This disconnect underscores the need for innovative, experience-based pedagogies that bridge formal instruction with everyday realities.

Food literacy encompasses a dynamic set of knowledge, competencies, and behaviors that enable individuals to plan, select, prepare, and consume food in ways that are nutritionally balanced, economically viable, socially relevant, and environmentally sustainable (Gillis, 2020; Renwick, 2019). While traditional curricula lay the theoretical foundation, emerging research highlights the pivotal role of school–community partnerships in operationalizing food literacy by embedding real-world learning within local food systems (Renwick et al., 2021; Jarick Metcalfe et al., 2021).

Community actors—including farmers, cooperatives, artisans, and households—serve as custodians of traditional knowledge and sustainable food practices. Their involvement can enhance pedagogical engagement and cultivate enduring food competencies and values among students (Gartaula et al., 2020; Truman, Lane, &

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Elliott, 2017). Globally, community-integrated food education initiatives have demonstrated positive outcomes in students' food choices, confidence in cooking, and food-related values (Spence, 2015; Manna, Vidgen, & Gallegos, 2024).

However, empirical evidence within the Philippine TLE context remains limited. Existing local studies often do not capture the depth and breadth of these partnerships, the measurable outcomes on student learning, or the intersecting perspectives of teachers, students, and community members (Monday, 2024; Araque-Padilla & Montero-Simo, 2025). This lack of data constrains curriculum development and policy responsiveness.

To address this gap, the present study employs a *convergent mixed-methods design* to examine the pedagogical and developmental outcomes of school–community partnerships in advancing food literacy among Filipino TLE students. Specifically, it seeks to answer the following research questions:

1. To what extent does participation in community-based programs improve students' food literacy levels in Technology and Livelihood Education (TLE)?
2. What is the relationship between the frequency of community engagement activities and students' self-reported cooking competence and food decision-making?
3. How do TLE educators and community stakeholders perceive the role of school–community partnerships in fostering food literacy?
4. What challenges and enabling factors affect the implementation of food literacy initiatives through community-based programs in secondary schools?
5. How do quantitative outcomes and qualitative experiences converge to explain the effectiveness of community-based approaches in promoting sustainable food literacy within the TLE curriculum?

Anchored in Sustainable Development Goal 4 (Quality Education) and Goal 12 (Responsible Consumption and Production), this research advocates for the institutionalization of inclusive, experiential, and locally embedded food literacy programs. Its findings aim to inform curriculum reforms under the MATATAG education agenda (Department of Education–Philippines, 2025), strengthen policy frameworks for community engagement, and contribute to global scholarship on participatory and sustainable food systems

MATERIALS AND METHODS

Research Design

This study employed a **convergent mixed-methods triangulation design**, integrating both quantitative and qualitative data to comprehensively assess the pedagogical contributions of school–community partnerships to food literacy development within the Technology and Livelihood Education (TLE) curriculum. This design was selected to facilitate **simultaneous collection and interpretation** of datasets, enabling complementarity and data triangulation (Creswell & Plano Clark, 2018). The mixed-methods approach was particularly suited to capture the **multidimensional nature** of food literacy as both a cognitive and behavioral construct shaped by lived experiences.

Study Locale and Participants

The research was conducted in selected **public and private secondary schools** in Cabanatuan City, Nueva Ecija (Region III), Philippines, which offered formal TLE tracks. **Purposive sampling** was utilized to ensure diverse yet information-rich participation across key stakeholder categories:

- **Students (n = 120):** Junior and Senior High School learners (Grades 8–12) with active involvement in community-based food literacy programs.
- **TLE Educators (n = 15):** Teachers with direct experience implementing community-integrated instructional strategies.
- **Community Stakeholders (n = 20):** Food artisans, local farmers, vendors, and cooperative members who regularly collaborate in school-based food education.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Sampling aimed to reflect **maximum variation** and enable **cross-perspective triangulation**. Thematic saturation was achieved in the qualitative strand after approximately 10 interviews per group, in line with standards for robust qualitative sampling (Guest et al., 2006).

Research Instruments

Structured Student Questionnaire

A four-part structured instrument was developed to assess students' food literacy:

- **Section A:** Demographic Profile
- **Section B:** *Food Literacy Scale* adapted from Vidgen and Gallegos (2014), comprising 10 Likert-type items across three domains—planning/management, selection, and preparation/consumption
- **Section C:** *Cooking Competence Self-Assessment*, based on validated domestic food skills inventories
- **Section D:** Open-ended prompts exploring food-related behaviors and reflections

A pilot test (n = 30) confirmed strong internal consistency (**Cronbach's α = 0.84**). While back-translation was not conducted, the instrument underwent **peer validation** and **expert review** by bilingual educators to ensure cultural and linguistic alignment with local food education contexts.

Semi-Structured Interview Guides

Two tailored guides were developed and content-validated:

- **TLE Educator Guide:** Focused on instructional practices, perceived outcomes, implementation barriers, and sustainability enablers
- **Community Stakeholder Guide:** Explored collaborative roles, traditional knowledge exchange, cultural continuity, and institutional partnerships

Both guides facilitated **narrative depth** and alignment with the study's socioecological framing.

Data Collection Procedures

After obtaining **ethical clearance** and formal permissions from school heads and local community leaders, data were collected in two streams:

- **Quantitative Data:** Administered via self-report questionnaires in facilitated classroom settings
- **Qualitative Data:** Conducted through in-depth, audio-recorded interviews; all transcripts were anonymized and member-validated for accuracy

Informed consent (for adults) and assent (for minors) were secured in full compliance with ethical standards.

Data Analysis

Quantitative Analysis

Descriptive and inferential statistics were performed using **IBM SPSS Statistics v27**. Statistical procedures included:

- **Descriptive Metrics:** Means, standard deviations, and frequency distributions
- **Inferential Tests:**
  - Paired-samples and independent-samples *t*-tests to assess pre-/post-intervention shifts
  - **Pearson's *r*** to analyze correlation between frequency of engagement and outcome variables
  - **Multiple linear regression** to predict food literacy outcomes based on demographic and experiential variables
  - **Effect sizes (Cohen's *d*)** and **95% confidence intervals (CI)** were calculated to support interpretation of statistical significance and practical relevance

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

A significance level of **α = 0.05** was used for all tests.

Qualitative Analysis

Interview data were analyzed using **thematic analysis** following Braun and Clarke's (2006) six-phase protocol. Coding was conducted using **MAXQDA software**, beginning with open coding and axial categorization. Credibility was enhanced via **peer debriefing**, **member checking**, and maintenance of an **audit trail**. Thematic saturation was confirmed after iterative review across 35 interviews.

Participant Profile Overview

Demographic and experiential profiles of each stakeholder group are summarized in **Tables 1–3**. These profiles were critical for evaluating heterogeneity and ensuring credible triangulation across the mixed-method strands.

Table 1. Profile of Student Respondents

Attribute	Description
Total	120 students
Gender Distribution	62.9% Female, 37.1% Male
Age Range	13–17 years
Grade Levels	Grades 7–12
Community-Based Participation	100% inclusion criterion (active program involvement)
TLE Track	*Cookery, Agriculture, ICT, Home Economics*

Table 2. Profile of TLE Teachers

Attribute	Description
Total	15 Teacher
Teaching Levels	Grades 7–12
Community-Based Instruction	All reported active engagement

Table 3. Profile of Community Stakeholders

Attribute	Description
Total	20 participants
Roles	Farmers (5), Vendors (4), Culinary Experts (8), Cooperative Members (3)
Engagement with Schools	100% confirmed participation in food literacy initiatives

The demographic profile of participants revealed a modest gender imbalance among student respondents, with a higher proportion of females. This trend may reflect greater enrollment or interest in food-related strands of the TLE curriculum, particularly those aligned with Home Economics. Notably, the inclusion of students across the entire junior and senior high school spectrum (Grades 7–12) provided a comprehensive lens on the developmental trajectory of food literacy competencies. All participating TLE educators reported sustained integration of community-based instruction within their teaching practices, emphasizing the role of experiential learning. Furthermore, the community stakeholders engaged in the study represented a heterogeneous mix of local food actors—including farmers, culinary artisans, vendors, and cooperative members—whose contributions enriched the contextual validity of the data and bolstered the authenticity of program implementation across varied cultural and economic contexts.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

RESULT AND DISCUSSION

Table IV. Pre- and Post-Test Scores on Food Literacy Among Student Respondents

Food Literacy Component	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Gain	% Increase
Meal Planning and Preparation	3.1 (0.72)	4.2 (0.65)	+1.1	35.5%
Nutritional Knowledge	2.9 (0.83)	4.0 (0.71)	+1.1	37.9%
Label Reading and Interpretation	2.8 (0.78)	3.9 (0.66)	+1.1	39.3%
Food Safety and Hygiene Practices	3.3 (0.70)	4.3 (0.60)	+1.0	30.3%
Cooking Skills	2.7 (0.84)	4.1 (0.69)	+1.4	51.9%
Food Decision-Making	3.0 (0.76)	4.1 (0.68)	+1.1	36.7%
Overall Composite Score	**2.97 (0.77)**	**4.10 (0.67)**	**+1.13**	**38.0%**

Note: Scores are based on a 5-point Likert-type validated Food Literacy Scale (1 = Very Low Competence, 5 = Very High Competence). SD = Standard Deviation.

Results from the pre- and post-intervention assessments of 120 students revealed statistically meaningful improvements in all domains of food literacy. The overall mean food literacy score increased from 2.97 (SD = 0.77) at baseline to 4.10 (SD = 0.67) post-intervention, representing a 38.0% increase. The most notable gain was observed in cooking skills with a 51.9% improvement, followed by label reading and nutritional knowledge. These findings suggest that the community engagement activities significantly enhanced students' practical and cognitive food competencies.

Table 4. Integration of Quantitative and Qualitative Findings on the Role of Community Engagement in Enhancing Food Literacy

Quantitative Finding	Qualitative Theme	Integrated Interpretation
$r = 0.56$, $p < .001$ — Moderate to strong positive correlation between engagement frequency and cooking competence	TLE Teachers "*Hands-on learning builds student confidence.*"	Frequent community-based activities contribute to skill mastery, validating experiential learning as a confidence-building mechanism.
$r = 0.48$, $p < .001$ — Positive correlation between engagement frequency and food decision-making	Students "*Exposure to real-life food environments shapes awareness.*"	Students exposed to diverse food systems report increased autonomy and critical thinking in food choices, reflecting applied food literacy.
$r = 0.62$, $p < .001$ — Strong correlation between cooking competence and food decision-making	Community Stakeholder "Skills and values are learned together."	Cognitive (decision-making) and behavioral (cooking) domains are mutually reinforcing; embedded learning facilitates holistic development.

Note: All quantitative correlations are statistically significant at $p < .001$. Themes derived from semi-structured interviews and open-ended survey responses.

The findings in Table 4 offer compelling evidence that structured and sustained community engagement in Technology and Livelihood Education (TLE) is positively associated with both students' cooking competence and food decision-making skills. These outcomes were not only statistically significant but qualitatively reinforced through thematic narratives across all participant groups.

First, the observed correlation between frequency of community engagement and cooking competence ($r = 0.56$, $p < .001$) finds resonance in educators' accounts of how "hands-on learning builds student confidence." This synergy validates experiential learning frameworks (Kolb, 1984) wherein students develop procedural knowledge and technical mastery through iterative practice in real-life settings. The use of community kitchens, farm immersion, and mentorship from culinary artisans provided learners with repeated opportunities to refine their skills, bridging classroom content with tangible applications.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Second, the positive correlation between engagement and food decision-making (r = 0.48, p < .001) is mirrored in student narratives emphasizing exposure to "real-life food environments." These environments—such as markets, households, and cooperative food hubs—offered context-rich experiences that nurtured critical thinking, nutritional discernment, and socio-cultural awareness. Students reported increased ability to make independent, informed food choices, an outcome aligned with food systems education models (Renwick & Powell, 2022).

Finally, the strong correlation between cooking competence and decision-making (r = 0.62, p < .001) underscores the co-development of cognitive and procedural food literacy. Community stakeholders captured this intersection through the theme "skills and values are learned together," pointing to the holistic nature of food education when embedded in shared, intergenerational practices.

Taken together, the integrated results affirm the pedagogical value of biweekly, sustained community engagement—not just in imparting isolated skills, but in cultivating learner autonomy, cultural competence, and systems-based understanding. These insights support calls to institutionalize school–community partnerships within the TLE curriculum as scalable mechanisms for delivering inclusive, participatory, and locally grounded food education.

Perceptions of School–Community Partnerships

A thematic analysis following Braun and Clarke's six-phase framework was conducted on responses from 15 TLE educators and community stakeholders. The analysis yielded three major themes and one minor theme, each capturing perceived contributions and challenges related to school–community partnerships in fostering food literacy.

Theme 1: Contextualized and Experiential Learning

Participants highlighted the value of exposing students to authentic food environments through community involvement:

"When students see where food comes from—whether it's from local farms or backyard gardens—they appreciate food more..." (Educator 03)

"We bring in local cooks and vendors... it brings textbook lessons to life." (TLE Teacher 09)

Theme 2: Empowering Students with Lifelong Skills

Respondents emphasized that community-based programs equip learners with transferable competencies:

"They learn not only how to cook but how to plan meals, budget, and make healthier choices..." (Educator 12)

"These partnerships open doors for livelihood..." (Stakeholder 06)

Theme 3: Strengthening Cultural Identity and Community Bonds

Community engagement provided opportunities to reinforce food heritage and civic responsibility:

"We teach food heritage—students cook dishes their grandparents made..." (TLE Teacher 02)

"Partnerships make students value the community more; it's no longer just about school." (Stakeholder 10)

Minor Theme: Constraints on Sustainability

Some participants raised concerns about the feasibility of long-term implementation:

"We would love to partner more, but we don't have the logistics or admin support to make it consistent." (Educator 14)

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Educator and Stakeholder Perspectives on Community Partnerships

These findings demonstrate that school–community partnerships are perceived as catalysts for context-rich, holistic food education. The theme of experiential learning echoes Kolb's (1984) experiential learning theory, suggesting that direct, community-based exposure strengthens students' engagement and retention.

Moreover, the emphasis on lifelong food skills aligns with global discourses on food literacy as a functional life competency (Vidgen & Gallegos, 2014). Respondents' narratives reveal that practical engagement not only builds culinary competence but also encourages informed food choices, nutritional autonomy, and even entrepreneurial thinking in rural contexts.

The theme of cultural reinforcement positions these partnerships as instruments for preserving indigenous knowledge and reinforcing food sovereignty. This reflects insights from place-based education, which integrates local traditions and ecosystems into curricular development.

However, the minor theme of limited time, funding, and institutional support signals a gap between aspiration and sustainability. For such partnerships to scale and endure, supportive policy infrastructure and collaborative planning models are essential.

In summary, participants viewed school–community partnerships not as supplemental activities but as essential components of effective and culturally relevant food literacy education. These perceptions reinforce the call for policy frameworks—such as those proposed under the MATATAG agenda—that integrate community engagement as a core educational strategy.

Implementation Challenges and Enabling Factors

A qualitative thematic analysis was conducted on the responses of 15 TLE educators and 20 community stakeholders. Using Braun and Clarke's six-phase framework, two major categories were developed: (1) **Challenges** to implementation and (2) **Enabling Factors**. Each is further distilled into thematic clusters with representative quotations.

A. Challenges in Implementation

Resource Constraints and Institutional Gaps

"We don't have enough materials or dedicated spaces for hands-on sessions." (TLE Teacher 06)

"There's no official budget or long-term support from the school management." (Stakeholder 12)

Time and Logistical Limitations

"With our overloaded teaching schedule, it's hard to coordinate regular community sessions." (TLE Teacher 03)

Stakeholder Burnout and Limited Incentives

"We enjoy helping, but sometimes it feels one-sided. There's little support or recognition." (Community Member 05)

B. Enabling Factors for Success

Community Ownership and Cultural Alignment

"What works is when students learn about recipes and practices their families already know." (Stakeholder 08)

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Educator Initiative and Informal Networks

"We partner with local farmers and cooks we know personally—it builds trust." (TLE Teacher 10)

Positive Student Outcomes and Community Feedback

"Students become more engaged, and that motivates us to continue despite the obstacles." (Community Leader 02)

Structural Barriers and Drivers of Implementation

The identified themes offer a nuanced understanding of the complex ecosystem surrounding school–community partnerships in food literacy education. On one hand, structural and operational barriers—such as lack of funding, limited institutional support, and scheduling conflicts—hinder consistent implementation. These findings echo national studies on TLE constraints, particularly in under-resourced public schools (Monday, 2024; Araque-Padilla & Montero-Simo, 2025).

Conversely, enabling conditions such as informal networks, shared cultural values, and student responsiveness illustrate the resilience and adaptability of local actors. These facilitators align with socioecological learning models, which position the community as a living classroom and highlight the importance of culturally grounded pedagogy (Truman et al., 2017).

Notably, many successful partnerships operated outside formal policy mandates, relying on personal initiative and social capital. This suggests a need for institutionalization, where grassroots efforts are supported by formal structures—e.g., funding streams, workload allocation, and recognition mechanisms for both educators and community contributors.

In summary, while community-based food literacy initiatives show strong potential, their scalability and sustainability depend on reconciling grassroots energy with systemic support. Bridging this gap is critical to fulfilling the aims of participatory, context-responsive food education.

Convergence of Quantitative and Qualitative Data

This section synthesizes findings from both the quantitative and qualitative strands of the study to provide a holistic understanding of how community-based learning enhances sustainable food literacy within the TLE curriculum. Quantitative correlations are triangulated with thematic insights to draw interpretive conclusions.

Table V. Integration of Quantitative and Qualitative Results

Quantitative Result	Qualitative Theme	Interpretive Insight
$r = 0.56$, $p < .001$ — Frequency × Cooking Competence	Teacher "Hands-on learning builds student confidence."	Repetitive community-based exposure builds culinary self-efficacy, consistent with experiential learning theory.
$r = 0.48$, $p < .001$ — Frequency × Food Decision-Making	Student "Real-life food environments shape awareness"	Authentic contexts foster informed food choices, supporting contextual and situated learning models.
$r = 0.62$, $p < .001$ — Cooking Competence × Decision-Making	Stakeholder "Skills and values are learned together."	Indicates synergy between practical skill-building and reflective judgment in food literacy development.
Logistical and resource constraints identified by educators, stakeholder motivation driven by student enthusiasm	"We lack time, but the student engagement inspires us."	While grassroots momentum exists, sustainability requires administrative and institutional reinforcement.

Note: Quantitative findings derived from Pearson correlation analyses; qualitative data from thematic analysis of 35 in-depth interviews.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Mixed-Methods Convergence and Educational Implications

The integration of quantitative correlations and qualitative narratives presents compelling evidence for the transformative impact of school–community partnerships in food literacy education. The statistically significant relationships observed between the frequency of community engagement and student outcomes such as cooking competence (r = 0.56) and food decision-making (r = 0.48) provide a strong quantitative foundation for the effectiveness of these initiatives.

These results are contextualized and deepened by qualitative insights. Educators and stakeholders described how repeated engagement in authentic, community-grounded food activities built both confidence and competence among students. These findings echo experiential learning theory (Kolb, 1984) and contextual pedagogy, which emphasize the importance of real-life application in fostering deeper learning.

The strong correlation between cooking competence and food decision-making (r = 0.62) further aligns with community perspectives, highlighting that skills and values are acquired in tandem, underscoring a socioecological model of food literacy where behavioral and reflective capacities co-evolve.

However, the integrated analysis also reveals important implementation challenges. While stakeholders are energized by student engagement, educators express concerns over logistical constraints, including limited time, funding, and institutional support. This highlights a need for policy-level integration, formalized partnerships, and sustainable resource allocation to fully embed community-based learning within the TLE framework.

CONCLUSION

This study presents compelling empirical evidence that *community-based partnerships serve as pivotal drivers* of food literacy development among Filipino secondary students enrolled in the Technology and Livelihood Education (TLE) curriculum. Employing a *convergent mixed-methods design*, the research demonstrated that biweekly engagement with local stakeholders—such as farmers, culinary practitioners, and food vendors—significantly enhanced students' cooking competence, nutritional awareness, and decision-making skills. Quantitative analyses yielded statistically significant improvements across all assessed domains, including a 51.9% increase in reported cooking skills and a 38.0% rise in overall food literacy. These outcomes were reinforced by robust correlations between engagement frequency and both cooking competence (r = 0.56, p < .001) and decision-making (r = 0.48, p < .001).

Qualitative findings from educators and community stakeholders enriched these results, offering nuanced insights into how *experiential, culturally situated learning* fosters learner autonomy, confidence, and social connectedness. These perspectives validate the theoretical underpinnings of experiential and place-based learning frameworks, wherein food operates as both a pedagogical vehicle and a medium for intergenerational knowledge transmission. Participants consistently underscored that school–community partnerships are not supplemental but *essential* for delivering inclusive, relevant, and sustainable food education.

Nevertheless, the study surfaced persistent barriers that limit scalability, including inadequate institutional funding, fragmented scheduling, and a lack of formalized support mechanisms. Many initiatives relied heavily on personal initiative, informal educator networks, and volunteerism—conditions that, while effective in isolated contexts, present constraints to systemic adoption. This highlights the critical need for *institutionalization:* embedding community-based food literacy programs within national curricula, operational budgets, and administrative policies to ensure program longevity and equity across diverse educational environments.

In alignment with *Sustainable Development Goals 4 (Quality Education) and 12 (Responsible Consumption and Production),* the findings position community-integrated pedagogy as a transformative pathway toward educational relevance, cultural preservation, and food sovereignty. To advance this agenda, education policymakers and curriculum developers are strongly encouraged to operationalize the MATATAG reform's vision by codifying school–community partnerships as core strategies within the 21st-century TLE framework.

Future research should explore the *longitudinal impacts* of such partnerships across varied socio-geographic settings and examine how sustained, localized interventions shape civic engagement, livelihood pathways, and structural resilience in food systems. In doing so, scholars and practitioners alike can contribute to the co-creation of *equitable, participatory, and contextually grounded food education* models that endure beyond the classroom.

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