International Journal of Pedagogy and Teacher Education

Journal Homepage: jurnal.uns.ac.id/ijpte

Assessing Institutional Readiness for Green Curriculum Implementation in Culinary Education

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ARTICLE INFO

Article History

Received: December 12, 2025

1st Revision: March 1, 2026

Accepted: March 10, 2026

Available Online: April 30, 2026

Keywords:

Green Currilumum; Culinary Education; Institutional Readiness; Sustainability-Oriented Curriculum; Vocational Education

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ABSTRACT

Sustainability pressures within global food systems have intensified the need to integrate environmental principles into professional culinary training. While prior research has largely focused on student-level sustainability awareness, limited empirical attention has been given to institutional readiness for Green Curriculum implementation in applied vocational contexts. This study assesses institutional readiness for Green Curriculum implementation in university level culinary education. A descriptive quantitative survey design was employed involving 50 academic stakeholders. Four variables were examined and descriptive statistical analysis indicates very high endorsement of sustainability integration in curriculum design and instructional strategies (overall mean scores above 4.0 on a five point scale). However, ratings for supporting and constraining institutional (X4) conditions were comparatively lower (4.07). Sustainable ingredient availability (X4) emerged as the lowest rated item (3.40), suggesting operational considerations in procurement and supply stability. Brief open-ended responses were used to contextualize these moderate ratings by highlighting concerns related to seasonal supply variability, cost instability, infrastructure readiness, and governance alignment. Overall, the findings reveal a readiness–constraint dynamic in which strong conceptual alignment coexists with structural and procurement-related limitations. This study provides a stakeholder-informed institutional mapping of feasibility conditions and implementation barriers to guide strategic Green Curriculum integration in culinary education.

How to cite: Nurlaela, L., Yushila, A. B., Muyasyaroh, H., Kamaruzaman, M. Y., (2025). Assessing Institutional Readiness for Green Curriculum Implementation in Culinary Education. *International Journal of Pedagogy and Teacher Education,* 10(1), 128-139. https://doi.org/10.20961/ijpte.v10i1.113384

1. INTRODUCTION

The accelerating climate crisis is closely linked to global food systems, making food production and consumption critical domains for mitigation. Food systems, spanning agricultural production, land-use change, processing, packaging, distribution, retail, and consumption, account for about one-third of anthropogenic greenhouse gas emissions, while food waste reaches around 931 million tons annually across retail, food service, and households (Crippa et al., 2021; FAO, 2021). Professional kitchens directly reflect these pressures through sourcing, preparation, portioning, and waste-management decisions. Culinary education therefore offers a strategic pathway for promoting sustainable production and consumption in line with SDG 12 and SDG 13 through sustainability-oriented vocational training (Corral-Verdugo, 2021; Wibowo & Wahyudi, 2019).

Education is widely recognized as a key mechanism for advancing sustainable development through competencies that integrate knowledge, skills, values, and ethical responsibility (Filho et al., 2018a; Wiek et al., 2016; Filho et al., 2020). Higher education institutions are increasingly expected to shape professional practice in line with environmental and social responsibility, including in culinary education, where sustainability-oriented learning should foster systems thinking, resource efficiency, and responsible production and consumption principles (Tilbury, 2019; Corral-Verdugo, 2021; UNESCO, 2020). Green Curriculum in this study is conceptualized as an integrated curricular approach that includes sustainability-oriented content, experiential and problem-based pedagogy, assessment of sustainability competencies, and institutional as well as operational alignment, including environmentally responsible laboratory and campus practices (Triyandana et al., 2024). Higher education literature frames Green Curriculum as an approach that aligns curriculum design, teaching strategies,

p-ISSN: 2597-7792 / e-ISSN: 2549-8525

DOI: https://doi.org/10.20961/ijpte.v10i1.113384

and institutional practices with sustainability objectives rather than treating environmental issues as isolated topics (Ni et al., 2024; Corpuz, 2022).

Sustainable culinary education extends beyond technical cooking proficiency to include food supply chains, resource efficiency, food waste reduction, energy use in kitchen operations, and circular economy principles within food systems (Morone et al., 2019). Curriculum integration may involve sustainable menu design, responsible sourcing of local and seasonal ingredients, environmentally conscious food processing, and waste minimization. Research suggests that such interventions can shape students' understanding of supply chains and production-consumption relationships while supporting applied competencies relevant to kitchen practice (Borsellino et al., 2020; Ni et al., 2024). Literature also highlights possible co-benefits, including stronger local producer networks, shorter supply chains, and healthier food offerings (Morone et al., 2019; Willett et al., 2019).

Recent studies on sustainability integration in culinary and vocational education have mainly examined student awareness, environmental values, pro-environmental intentions, sustainability literacy, and behavioral intention (Kustiani & Mulyani, 2022; Ni et al., 2024; Filho et al., 2018b; Cebrián et al., 2020). These studies provide important evidence at the individual level, but limited attention has been given to institutional readiness, curriculum mapping, facility adequacy, policy alignment, and collaboration with industry partners. Empirical research on stakeholder perspectives across academic leadership, laboratory management, teaching staff, and institutional support systems therefore remains limited. This study addresses those gaps by examining stakeholder perceptions of the opportunities, design considerations, implementation strategies, and enabling and constraining factors associated with Green Curriculum integration in culinary education. Institutional, curricular, and operational dimensions are positioned as central elements of sustainability integration rather than as secondary extensions of student-level outcomes. Sustainability integration in culinary education has been reported as uneven across institutions. Sustainability themes are increasingly discussed, yet their translation into practices such as waste auditing, sustainable procurement, portion control, energy and water efficiency, and environmentally responsible packaging remains inconsistent in vocational and hospitality programs (Filimonau & De Coteau, 2019; Filho et al., 2018a). Variation appears to lie in how far sustainability is embedded in curriculum structures, laboratory procedures, and industry-linked training, and these gaps may weaken graduates' preparedness to address sustainability challenges in real-world kitchen settings.

Green Curriculum has not yet been empirically examined in university-level culinary education programs in Indonesia, despite its growing relevance. Sustainability-related practices may exist in laboratory settings, but they are rarely formalized in curriculum frameworks, mapped to learning outcomes, incorporated into practicum SOPs, assessed through structured rubrics, or aligned with industry placement standards. The present study therefore investigates stakeholder perceptions of Green Curriculum integration in Indonesian university-level culinary education and maps: (1) implementation opportunities, (2) Green Curriculum design components, (3) implementation strategies, and (4) enabling and constraining institutional conditions. Using a descriptive quantitative survey design, the study provides an evidence-based overview of institutional readiness and perceived barriers while shifting the analytical focus from student-level outcomes to institutional and structural dimensions of Green Curriculum implementation.

2. MATERIAL AND METHOD

Research Design

This study employed a descriptive quantitative survey design to assess institutional readiness for Green Curriculum implementation in university-level culinary education (Sugiyono, 2017). Descriptive survey research is appropriate for mapping patterns of perception, institutional readiness, and implementation challenges within specific professional contexts (Molina-Azorin & Cameron, 2015; Creswell & Creswell, 2018; Hair et al., 2019). The study was conducted within a university culinary education program that includes both theoretical coursework and practicum-based kitchen laboratory components. This operational context is particularly relevant for Green Curriculum implementation because culinary laboratories involve procurement decisions, energy use, portion control practices, and waste management systems that directly reflect sustainability integration in professional training environments. Data collection was conducted between June to July 2025. The institutional setting was selected because it represents a typical higher education culinary program with established laboratory facilities and structured curriculum implementation.

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

Participants

Participants were stakeholders directly involved in the governance and operation of the culinary program, including study program coordinators, laboratory heads, lecturers, and educational staff. Purposive sampling was employed to ensure the inclusion of information-rich participants who met the following eligibility criteria: (1) active involvement in the culinary education program, (2) a minimum of one year of service, and (3) engagement in curriculum implementation or laboratory management. A total of 50 respondents completed the questionnaire. After screening for completeness, all 50 responses were retained for analysis.

Research Instruments and Data Collection

Quantitative data were collected using a structured questionnaire administered through Google Forms. The instrument comprised four constructs: X1, Implementation Opportunities; X2, Green Curriculum Design Components; X3, Implementation Strategies; and X4, Supporting and Constraining Factors (OECD, 2018). Each construct was measured using five-point Likert scale items, ranging from 1 (strongly disagree) to 5 (strongly agree). A pilot test involving 30 respondents was conducted to evaluate item clarity and internal consistency. Confidentiality within the university setting was maintained by excluding identifying information, anonymizing all responses, and restricting data access to the research team. Several brief open-ended questions were also included to enrich the interpretation of selected quantitative findings. These items were used only to provide contextual support for the quantitative results and were not treated as a formal qualitative strand. Responses were summarized descriptively and used to clarify moderate ratings, particularly within the Supporting and Constraining Factors construct (Creswell & Plano Clark, 2018; Sugiyono, 2021).

Data Analysis

Quantitative data were analyzed using **SPSS** version 29. The analysis procedures included: (1) descriptive statistics, consisting of mean, standard deviation, and 95% confidence interval; (2) composite construct scores, calculated as the mean of item scores within each variable; (3) item performance analysis using corrected item–total correlations; and (4) internal consistency reliability analysis using Cronbach's alpha (Darma, 2021). A Cronbach's alpha value of ≥ 0.70 was considered acceptable for exploratory research (Hair et al., 2019). Corrected item–total correlations were interpreted as indicators of item consistency rather than evidence of full construct validity, since exploratory factor analysis was not performed. Mean scores were then classified using standard Likert scale interval groupings. The formula used to determine the category intervals was adapted from Sugiyono (2019), as follows:

$$Interval = \frac{Highest\ Score - Lowest\ Score}{Number\ of\ Group} = \frac{5-1}{5} = 0.80$$

Based on the interval calculations above, the category grouping can be seen in Table 1 (Ghozali, 2016; Sugiyono, 2019).

Table 1. Mean Score Category

Mean Score Range	Category	Contextual Meaning
1.00 – 1.80	Very Low	Consistently showing disagreement
1.81 – 2.60	Low	Consistently moderate disagreement
2.61 – 3.40	Moderate	Showing uncertainty
3.41 – 4.20	High	Showing a tendency to agree
4.21 – 5.00	Very High	Consistently showing strong agreement

3. RESULTS

Sample Characteristics

A total of 55 eligible stakeholders were invited to participate in the study. Of these, 50 completed questionnaires were returned and retained for analysis, resulting in a response rate of 86.2%. No questionnaire exceeded 5% missing data per construct; therefore, all 50 responses were included in the final dataset. As shown in Table 2, the sample was predominantly female (96%) and largely composed of senior academic staff. Specifically, 68% of respondents were over 51 years old, and 72% reported more than 20 years of professional experience. In terms of institutional roles, lecturers constituted the majority (78%), followed by study program

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

administrators (14%), while laboratory coordinators and educational staff accounted for smaller proportions. Beyond describing the demographic distribution, these characteristics also have interpretive implications. The dominance of senior and highly experienced lecturers suggests that the findings primarily reflect the perspectives of individuals directly involved in curriculum implementation and long-term institutional practice. Such respondents are likely to possess substantial insight into curriculum structure, laboratory operations, and institutional constraints, thereby strengthening the credibility of assessments related to implementation feasibility.

Table 2. Sample Characteristics (N=50)

Characteristics		Frequency	Percentage
Gender	Male	2	4 %
	Female	48	96 %
Age	< 35 years	6	12 %
	36 – 40 years	5	10 %
	41 - 45 years	1	2 %
	46 – 50 years	4	8 %
	> 51 years	34	68%
Position	Study Program Manager (Head of Study Program/Secretary)	7	14 %
	Head or Laboratory Coordinator	1	2 %
	Lecturer	39	78 %
	Educational Staff	2	4 %
	Other	1	2 %
Year of Experience	< 5 years	2	4 %
	5 – 10 years	4	8 %
	11 - 15 years	4	8 %
	16 – 20 years	4	8 %
	> 20 years	36	72 %

The sample composition also indicates several limitations. Limited representation from laboratory management, procurement personnel, and external industry partners may restrict the range of perspectives on operational sustainability practices, such as supply-chain coordination and resource procurement systems. The findings should therefore be interpreted as reflecting internal academic stakeholder perceptions within a single institutional context rather than the full ecosystem of culinary education stakeholders. This demographic concentration is consistent with previous studies on sustainability in higher education, in which senior academic staff often serve as the primary respondents in institutional readiness assessments (Filho et al., 2018a; Wals, 2019). Broader multi-stakeholder sampling, including industry partners and operational personnel, would strengthen external validity in future research.

Internal Consistency and Item Performance

Item performance was evaluated using corrected item–total correlations to determine the extent to which each item was consistently aligned with its respective construct. The analysis showed that all items exceeded the acceptable threshold of $r \geq 0.30$, indicating that each item contributed adequately to the overall consistency of the scale and was therefore retained for subsequent analysis. These findings provide preliminary evidence of internal structural consistency within the sample, suggesting that the items functioned in a reasonably coherent manner in measuring their intended dimensions. Internal consistency reliability was further assessed using Cronbach's alpha for each construct. The results indicated that all four constructs achieved acceptable reliability coefficients ($\alpha \geq 0.70$), demonstrating satisfactory internal consistency for exploratory institutional research (Hair et al., 2019). Taken together, these results suggest that the instrument possessed an adequate level of measurement consistency and was suitable for use in the descriptive analysis of stakeholder perceptions regarding Green Curriculum implementation.

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

Construct-Level Quantitative Findings

The construct-level analysis was conducted to examine the overall pattern of stakeholder perceptions across the four dimensions of Green Curriculum implementation. This analysis provides a comparative overview of how respondents evaluated the relative strength of each construct and helps identify which dimensions were perceived as the most strongly supported and which still reflected potential institutional constraints. Table 3 presents the composite-level results for the four variables. The ranking reveals a clear pattern in stakeholder perceptions. Green Curriculum Design Components (X2) obtained the highest composite mean, followed by Implementation Opportunities (X1) and Implementation Strategies (X3) (Astuti, 2016). All three variables were categorized as "very high," indicating strong conceptual alignment between sustainability principles and culinary education practices. Supporting and Constraining Factors (X4), by contrast, produced a comparatively lower composite mean, although it still fell within the "high" category. Within this construct, sustainable ingredient availability (M = 3.40) and cost-related considerations were the lowest-rated items, suggesting the presence of structural and supply-chain constraints (Astuti, 2016).

Table 3. Construct-Level Summary of Green Curriculum Implementation

Rank	Construct	Composite Mean	SD	95% CI	Category	Highest-Rated Item (Mean)	Lowest-Rated Item (Mean)	Interpretive Insight
1	X2 – Green Curriculum Design	4.68	0.35	4.58 – 4.78	Very High	Zero-waste integration (4.86)	Circular economy integration (4.34)	Strong consensus on priority design components
2	X1 – Implementation Opportunities	4.61	0.40	4.50 – 4.72	Very High	Curriculum relevance (4.72)	Industry competitiveness (4.48)	High perceived institutional readiness
3	X3 – Implementation Strategies	4.55	0.43	4.43 – 4.67	Very High	Integration into practicum (4.66)	Sustainability projects (4.48)	Operational embedding strongly supported
4	X4 – Supporting & Constraining Factors	4.07	0.47	3.94 – 4.20	High	Lecturer competence (4.54)	Sustainable ingredient availability (3.40)	Structural and supply-chain bottlenecks identified

The relatively narrow confidence intervals across the four constructs indicate a consistent level of agreement among respondents. The clustering of very high scores in X1–X3, however, may also suggest a ceiling effect, in which strong consensus reduces response variability (Hair et al., 2019). Under such conditions, the most analytically informative findings may lie not in the highest-rated dimensions, but in the comparatively moderate items that point to operational bottlenecks. These results should also be interpreted with caution, as they reflect perception-based assessments within a single institutional context. Accordingly, they provide descriptive

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

evidence of institutional readiness rather than direct evidence of changes in consumption patterns, production practices, or sustainability outcomes.

4. Discussion

Interpretation of the Overall Pattern

The overall pattern of findings indicates strong normative endorsement of Green Curriculum integration among senior academic stakeholders. Stakeholders reported very high levels of agreement regarding Green Curriculum design components (X2), implementation opportunities (X1), and implementation strategies (X3). This pattern suggests that sustainability principles are widely perceived as relevant, appropriate, and structurally compatible with culinary education. Conceptual support for Green Curriculum integration therefore appears to be well established within the institutional context examined in this study. Such strong endorsement is consistent with previous research showing that academic staff in higher education generally demonstrate positive attitudes toward sustainability-oriented curriculum reform and recognize its importance in preparing graduates to address contemporary environmental challenges (Filho et al., 2018b; Cebrián et al., 2020).

A contrasting pattern emerges in the supporting and constraining factors construct (X4), which received comparatively lower ratings than the other three dimensions. This result suggests that, although Green Curriculum is strongly supported at the conceptual level, its practical implementation remains influenced by institutional and operational constraints. Lower ratings on items related to sustainable ingredient availability and cost considerations indicate that implementation feasibility may depend less on conceptual acceptance and more on resource allocation, procurement systems, infrastructure readiness, and collaboration with external partners. Green Curriculum implementation in culinary education, therefore, should not be understood solely as a pedagogical issue, but also as an institutional and operational challenge that requires material, administrative, and logistical support.

A readiness–constraint dynamic is clearly reflected in these findings. Strong normative alignment with sustainability goals coexists with practical limitations that may slow or complicate implementation. A similar pattern is emphasized in the sustainability transition literature, which shows that curriculum reform can only be translated into practice when supported by governance alignment, infrastructure readiness, and adequate financial support (Wals, 2019; Filimonau & De Coteau, 2019). Culinary education is especially sensitive to these conditions because sustainability-oriented practice depends heavily on tangible operational arrangements, including sourcing systems, food storage, waste handling, and laboratory management. High endorsement of Green Curriculum principles may therefore indicate institutional willingness, but not necessarily full institutional preparedness for sustained implementation.

An important contribution of this study lies in its simultaneous mapping of both endorsement and constraint dimensions. Existing studies have more often emphasized student attitudes, awareness, or behavioral intentions, whereas the present findings draw attention to the institutional and structural conditions that shape implementation feasibility. Interpretation of the results should therefore move beyond the assumption that positive attitudes will automatically lead to sustainable practice. A more nuanced reading suggests that Green Curriculum integration in culinary education is shaped by the interaction between conceptual commitment and operational capacity. Institutional readiness, in this sense, should be understood not as a single condition, but as a layered process involving curriculum design, implementation strategy, governance support, and resource availability. Findings of this study therefore help address the identified research gap by showing that Green Curriculum implementation in culinary education depends not only on educational endorsement, but also on the extent to which institutions are able to align policy, infrastructure, and procurement systems with sustainability objectives (Widiaty et al., 2024).

From Conceptual Endorsement to Curriculum Design Priorities

The strong endorsement of Green Curriculum design components (X2) provides a stakeholder-informed framework for prioritizing curriculum development in culinary education. Instead of positioning sustainability merely as a normative aspiration, the findings identify design elements that stakeholders perceive as both relevant and feasible within applied culinary contexts. Zero-waste integration, as the highest-rated design component, suggests that food waste management should function as a central organizing principle across both theoretical and practicum modules. Such integration may include structured instruction on waste auditing, portion optimization, inventory planning, and post-production utilization. This pattern is consistent with the TVET

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

sustainability literature, which emphasizes the integration of operational sustainability competencies into vocational training contexts (Cebrián et al., 2020; UNESCO, 2020). Previous research also indicates that food waste reduction is among the most actionable sustainability competencies in hospitality and culinary training environments (Filimonau & De Coteau, 2019; Papargyropoulou et al., 2019). Incorporation of structured waste auditing, portion optimization, and redistribution practices into laboratory modules therefore reflects a competency-based approach to sustainability education rather than an awareness-only orientation.

Strong ratings for local sourcing and energy-efficient cooking further indicate that sustainability content should extend beyond environmental awareness toward applied decision-making skills. Studies on sustainability-oriented higher education argue that transformative curriculum design requires environmental principles to be linked with authentic professional tasks (Brundiers et al., 2021; Lozano et al., 2019). In culinary education, this connection may be operationalized through menu design assignments that incorporate local and seasonal ingredients, energy-calibrated cooking techniques, and reflective analysis of sourcing choices. These approaches are consistent with sustainability-oriented higher education models that emphasize the development of applied competencies rather than declarative knowledge alone (Filho et al., 2018a; Wals, 2019).

The comparatively lower, although still high, rating for circular economy integration suggests that systems-level sustainability concepts may require more explicit pedagogical scaffolding. Circular economy principles often demand systems-thinking competencies that extend beyond routine laboratory practices (Kirchherr et al., 2018; Mendoza et al., 2019). Curriculum mapping may therefore benefit from a phased integration approach, beginning with operational waste reduction and gradually progressing toward broader circularity frameworks. A major contribution of this study lies in its empirical identification of the sustainability design components most strongly prioritized by stakeholders within culinary education. Sustainability integration has been widely discussed in higher education (Filho et al., 2018b; Wals, 2019), yet empirical mapping remains limited in vocational culinary contexts. Translation of stakeholder endorsement patterns into specific design priorities allows this study to offer a context-sensitive reference for curriculum development rather than a generalized model of sustainability advocacy.

Implementation Pathway and System Requirements

Strong endorsement across the design and implementation constructs indicates broad conceptual support for Green Curriculum integration. A comparatively lower composite mean for Supporting and Constraining Factors (X4), however, suggests that operational feasibility depends on systemic alignment. This finding is consistent with sustainability transition scholarship, which emphasizes that institutional transformation is shaped by governance, infrastructure, and procurement systems rather than by pedagogical intent alone (Wals, 2019; Boström et al., 2018).

Moderate ratings for sustainable ingredient availability and cost-related considerations highlight the importance of supply-chain coordination. Research on food systems shows that sustainable sourcing in institutional settings is often constrained by price volatility, distribution networks, and supplier capacity (Poore & Nemecek, 2018; Garnett et al., 2020). Green Curriculum implementation in culinary education therefore cannot be understood solely as a classroom-level intervention; it also requires structural alignment in procurement and resource management. This pattern is in line with sustainability transition research, which emphasizes that institutional transformation depends on governance coordination and infrastructural readiness rather than on individual attitudes alone (Wals, 2019; Filimonau & De Coteau, 2019). An actionable implementation pathway may therefore involve several coordinated layers. Curriculum-level alignment should formalize sustainability learning outcomes and integrate measurable indicators into assessment rubrics. Research in sustainability education emphasizes that explicit learning outcomes and assessment coherence are essential for embedding sustainability competencies (Brundiers et al., 2021; Cebrián et al., 2020). Such alignment ensures that Green Curriculum principles are reflected not only in content delivery but also in competency evaluation.

Practicum standard operating procedures (SOPs) should also incorporate measurable sustainability indicators, such as waste benchmarks, sourcing documentation, and energy-monitoring protocols. Studies in hospitality sustainability suggest that the inclusion of measurable operational indicators can strengthen the behavioral internalization of sustainability practices (Filimonau et al., 2020). Staff capacity development represents another important requirement. Although lecturer competence received relatively high ratings, structured training in sustainability metrics, resource auditing, and circular design could improve implementation

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

consistency. Previous research highlights professional development as a critical enabling condition for sustainability-oriented curriculum reform (Filho et al., 2018b). Formalization of industry partnerships is equally necessary. Collaboration may be widely perceived as valuable, yet practical constraints, particularly those related to ingredient supply stability, indicate that partnership mechanisms need to move beyond symbolic engagement toward structured procurement agreements and shared sustainability standards. The implementation pathway emerging from this study can therefore be conceptualized as a multi-layer alignment model involving curriculum design alignment (X2), operational embedding (X3), and institutional support systems (X4). Strong endorsement combined with moderate structural constraints suggests that policy support and resource coordination may serve as leverage points for moving from conceptual readiness to operational sustainability practice. Institution-specific and perception-based characteristics of these findings should also be acknowledged. The study does not demonstrate measurable changes in sustainable consumption or production patterns. Descriptive mapping of readiness conditions and implementation barriers is what it offers, and these insights may inform future strategic planning in culinary education contexts.

Contextual Explanation of Supporting and Constraining Factors

Brief open-ended responses were reviewed to provide contextual clarification for the construct-level findings, particularly the moderate ratings observed in Supporting and Constraining Factors (X4). As shown in Table 4, X4 obtained a comparatively lower composite mean than the other constructs, with sustainable ingredient availability emerging as the lowest-rated item. Although the overall mean for X4 remained high (M = 4.07), this construct received lower ratings than the others, indicating that practical implementation may be influenced by procurement-related and structural considerations despite strong overall institutional endorsement of Green Curriculum integration.

Table 4. Contextual Clarification

Quantitative Finding	Mean	Thema	Contextual Explanation
Circular economy integration	4.34	Institutional policy support	Circular economy principles are conceptually endorsed. However, stakeholders note that formal governance integration remains under development.
Industry competitiveness	4.48	Industry collaboration & cost	Stakeholders perceive sustainability as strengthening institutional competitiveness, although operational alignment with industry partners may require continued coordination.
Sustainability projects	4.48	Infrastructure readiness	Sustainability oriented projects are strongly supported; however, scaling such initiatives requires adequate infrastructure and resource allocation.
Sustainable ingredient availability	3.40	Sustainable procurement constraints	Procurement instability, seasonal supply variability, and price fluctuation limit consistent implementation.

Open-ended responses suggest that the moderate rating for ingredient availability reflects practical procurement challenges rather than conceptual disagreement with sustainability principles. Respondents indicated that, although local and sustainable ingredients are pedagogically desirable, consistent supply is influenced by seasonal variability, distribution limitations, cost fluctuations, and supplier reliability. These conditions affect the feasibility of embedding sustainable sourcing practices into routine laboratory activities (Braun & Clarke, 2019). Items related to circular economy integration and sustainability-oriented projects also received high quantitative ratings, but respondents noted that governance formalization, infrastructure readiness, and resource allocation are still developing (Dziubaniuk & Aarikka-Stenroos, 2025). These contextual

p-ISSN: 2597-7792 / e-ISSN: 2549-8525
DOI: https://doi.org/10.20961/ijpte.v10i1.113384

explanations indicate that, although sustainability integration is conceptually endorsed, its operationalization depends on institutional alignment and procurement stability. Findings from this study are consistent with broader research on sustainable food systems, which identifies supply-chain instability and cost variability as common barriers to institutional sustainable procurement (Poore & Nemecek, 2018; Garnett et al., 2020). Research in hospitality and food service contexts similarly shows that sustainability implementation is often constrained by distribution infrastructure, supplier capacity, and price competitiveness relative to conventional products (Filimonau & De Coteau, 2019). Strengthening supplier partnerships, formalizing sustainable procurement policies, and developing long-term sourcing agreements may therefore function as important leverage points for aligning curriculum intentions with operational feasibility. Taken together, these contextual responses reinforce the readiness-constraint dynamic identified in the quantitative findings. Primary challenges appear to be related to structural feasibility and resource coordination rather than resistance to sustainability integration. This clarification strengthens the descriptive interpretation of institutional readiness while remaining within the limits of perception-based assessment.

Institutional Implications and Implementation Pathways

The findings of this study carry several implications for sustainability-oriented culinary education. Consistently high ratings for curriculum design (X2) and implementation strategies (X3) indicate strong normative alignment among academic stakeholders regarding the integration of sustainability principles. This pattern suggests institutional readiness at the conceptual level. Comparatively moderate ratings within Supporting and Constraining Factors (X4), particularly for sustainable ingredient availability, further highlight the importance of structural alignment. Effective Green Curriculum implementation appears to require coordinated procurement systems, formalized institutional policies, and investment in supporting infrastructure. Qualitative responses also indicate that sustainability integration in culinary education extends beyond technical adjustments to course content (Wals, 2019; Filimonau et al., 2020). Sustainability-oriented reform involves embedding resource efficiency, waste management practices, and environmental awareness into practicum design, laboratory management, and broader institutional governance structures (Brundiers et al., 2021; Garnett et al., 2020). These findings suggest that the transition toward sustainability-oriented culinary education may benefit from phased institutional strategies, including policy formalization, staff capacity development, infrastructure adaptation, and stronger supplier partnerships (Garnett et al., 2020; Filimonau & De Coteau, 2019). Green Curriculum should not be framed as an immediate institutional transformation. Results instead reflect a readiness–constraint dynamic in which strong conceptual support coexists with operational limitations. Sustainability integration, in this context, can be understood as a process of institutional development that aligns curriculum objectives with operational feasibility and governance structures (Wals, 2019; Brundiers et al., 2021; Garnett et al., 2020). This study is limited to perception-based responses within a specific institutional context and does not directly measure behavioral or environmental outcomes. Future research may examine longitudinal implementation processes and conduct cross-institutional comparisons to validate the readiness–constraint dynamic identified in this study

5. CONCLUSION

This study assessed institutional readiness for Green Curriculum implementation in university-level culinary education through a descriptive quantitative survey of academic stakeholders. In response to the limited empirical attention given to the institutional dimensions of sustainability integration, the findings reveal strong endorsement of Green Curriculum design and instructional integration. Stakeholders perceived sustainability principles as relevant and structurally compatible with culinary education. Comparatively lower ratings for Supporting and Constraining Factors, particularly sustainable ingredient availability, nevertheless indicate the presence of operational and procurement-related bottlenecks. These results suggest a readiness–constraint dynamic in which conceptual alignment coexists with structural limitations. Rather than demonstrating measurable sustainability outcomes, this study provides a stakeholder-informed mapping of curriculum priorities and enabling conditions for implementation. Because the findings are perception-based and derived from a single institutional context, they should be interpreted with caution. Future research should incorporate multi-site validation and outcome-based indicators to strengthen the evidence base for sustainability-oriented curriculum reform in culinary education.

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