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Sany da Silva Motta, Ricardo César da Silva Guabiroba

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Lived Experiences of Food Waste Reframing in a Brazilian Public High School: An Interpretative Phenomenological Study of Entrepreneurial Learning¹

Autor 1: Sany da Silva Motta

Programa de Pós-Graduação em Administração – Universidade Federal Fluminense (UFF)

Rio de Janeiro – RJ – Brasil

E-mail: sany.motta@id.uff.br

ORCID: <https://orcid.org/0009-0006-3729-6046>

Autor 2: Ricardo Cesar Guabiroba

Programa de Pós-Graduação em Administração – Universidade Federal Fluminense (UFF)

Rio de Janeiro – RJ – Brasil

E-mail: ricardocesar@id.uff.br

ORCID: <https://orcid.org/0000-0003-4108-846X>

Autor correspondente:

Sany da Silva Motta

E-mail: sany.motta@id.uff.br

Abstract

This study examines how public high school students experience, interpret, and reframe food waste as an entrepreneurial learning issue. Although school food waste is often approached as an operational, nutritional, environmental, or behavioral problem, little is known about how students make sense of this phenomenon in school life. Drawing on Interpretative Phenomenological Analysis, the article analyzes 18 in-depth interviews conducted through the Significant Actions technique with students enrolled in an entrepreneurship track in a public high school in Rio de Janeiro, Brazil. The findings show that food waste was initially experienced as a visible but normalized feature of the school routine. Of the 18 participants, 16 described moral discomfort associated with discarded food, including guilt, indignation, sadness, or reflective questioning. In addition, 14 identified systemic factors as relevant causes of waste, especially rushed meal times, menu repetition, portioning practices, refectory organization, and limited student voice. Rather than attributing waste solely to individual behavior, students gradually interpreted it as a systemic issue shaped by school organization. The study contributes to entrepreneurship education by showing that entrepreneurial learning may emerge from lived encounters with ordinary institutional problems when these are pedagogically reframed as opportunities for responsibility, problem framing, and social value creation.

Keywords: interpretative phenomenological analysis; entrepreneurial learning; food waste; public education; sustainability education; student voice; social value creation.

Título

Experiências vividas de ressignificação do desperdício de alimentos em uma escola pública brasileira de Ensino Médio: um estudo fenomenológico interpretativo sobre aprendizagem empreendedora

Resumo

Este estudo analisa como estudantes do Ensino Médio público vivenciam, interpretam e ressignificam o desperdício de alimentos como questão vinculada à aprendizagem empreendedora. Embora o desperdício alimentar escolar seja frequentemente abordado como problema operacional, nutricional, ambiental ou

¹ The empirical data supporting this study are not publicly available because they involve underage students and contain potentially sensitive information whose disclosure could permit indirect identification. Anonymised materials may be considered upon reasonable request to the corresponding author, subject to the consent and assent terms and to applicable ethical, legal and institutional requirements.

comportamental, ainda são escassas as investigações sobre os sentidos atribuídos pelos estudantes a esse fenômeno no cotidiano escolar. Com base na Análise Fenomenológica Interpretativa, o artigo examina 18 entrevistas em profundidade realizadas por meio da técnica de Ações Significativas com estudantes matriculados em um itinerário formativo de empreendedorismo em uma escola pública do Rio de Janeiro, Brasil. Os resultados indicam que o desperdício foi inicialmente percebido como ocorrência visível, porém normalizada, da rotina escolar. Dos 18 participantes, 16 relataram desconforto moral diante do descarte de alimentos, incluindo culpa, indignação, tristeza ou questionamento reflexivo. Além disso, 14 identificaram fatores sistêmicos como causas relevantes do desperdício, especialmente o tempo reduzido para as refeições, a repetição do cardápio, as práticas de porcionamento, a organização do refeitório e a limitada escuta dos estudantes. Em vez de atribuírem o desperdício exclusivamente ao comportamento individual, os estudantes passaram a interpretá-lo como questão sistêmica, condicionada pela organização escolar. O estudo contribui para a educação para o empreendedorismo ao demonstrar que a aprendizagem empreendedora pode emergir do encontro vivido com problemas institucionais cotidianos, quando estes são pedagogicamente ressignificados como oportunidades de responsabilidade, formulação de problemas e criação de valor social.

Palavras-chave: análise fenomenológica interpretativa; aprendizagem empreendedora; desperdício de alimentos; educação pública; educação para sustentabilidade; voz estudantil; criação de valor social.

Título

Experiencias vividas de resignificación del desperdicio de alimentos en una escuela secundaria pública brasileña: un estudio fenomenológico interpretativo sobre el aprendizaje emprendedor

Resumen

Este estudio analiza cómo estudiantes de una escuela secundaria pública vivencian, interpretan y resignifican el desperdicio de alimentos como una cuestión vinculada al aprendizaje emprendedor. Aunque el desperdicio alimentario escolar suele abordarse como un problema operativo, nutricional, ambiental o comportamental, aún son escasas las investigaciones sobre los significados que los propios estudiantes atribuyen a este fenómeno en la vida escolar cotidiana. Con base en el Análisis Fenomenológico Interpretativo, el artículo examina 18 entrevistas en profundidad realizadas mediante la técnica de Acciones Significativas con estudiantes matriculados en un itinerario formativo de emprendimiento en una escuela pública de Río de Janeiro, Brasil. Los resultados muestran que el desperdicio fue inicialmente experimentado como una ocurrencia visible, aunque normalizada, de la rutina escolar. De los 18 participantes, 16 describieron malestar moral ante el descarte de alimentos, incluyendo culpa, indignación, tristeza o cuestionamiento reflexivo. Además, 14 identificaron factores sistémicos como causas relevantes del desperdicio, especialmente el tiempo reducido para las comidas, la repetición del menú, las prácticas de porcionamiento, la organización del comedor y la limitada escucha de los estudiantes. En lugar de atribuir el desperdicio exclusivamente al comportamiento individual, los estudiantes pasaron a interpretarlo como una cuestión sistémica, condicionada por la organización escolar. El estudio contribuye a la educación para el emprendimiento al demostrar que el aprendizaje emprendedor puede emerger del encuentro vivido con problemas institucionales cotidianos, cuando estos son pedagógicamente resignificados como oportunidades de responsabilidad, formulación de problemas y creación de valor social.

Palabras clave: análisis fenomenológico interpretativo; aprendizaje emprendedor; desperdicio de alimentos; educación pública; educación para la sostenibilidad; voz estudiantil; creación de valor social.

1. Introduction

Food waste in schools is commonly treated as a matter of logistics, nutrition, environmental management, or student behavior, with studies frequently emphasizing plate waste, menu acceptance, food service organization, and consumption patterns (TRICHES; SCHNEIDER, 2010; PORPINO; PARENTE; WANSINK, 2016). Such approaches are necessary, particularly in public education systems where school meals are closely linked to food security, school permanence, and the right to adequate nutrition. However, they leave underexplored a central educational question: how do students actually experience food waste in their everyday school lives, and how can those experiences become a basis for reflection, responsibility, and entrepreneurial learning?

This question is especially relevant in Brazilian public schools, where school feeding is not a peripheral service but a public policy with strong social and educational implications. The Programa Nacional de Alimentação Escolar (PNAE) provides meals to millions of students and represents one of the most important institutional mechanisms for guaranteeing access to food during the school day, connecting school feeding to food security, school permanence, and the right to adequate nutrition (FNDE, 2020; TRICHES; SCHNEIDER, 2010). Yet, in many schools, food waste is simultaneously visible and unexamined. Students see trays being discarded, observe food being rejected, and notice differences between what is served and what is eaten. Nevertheless, these observations rarely become objects of pedagogical inquiry.

This article argues that such everyday experiences matter. Food waste is not only an environmental or operational issue; it is also a lived phenomenon through which students encounter questions of need, inequality, responsibility, institutional organization, and collective action. When students describe food being thrown away while recognizing that some classmates depend on school meals, they are not merely reporting a logistical inefficiency. They are articulating a moral and social interpretation of school life, which can be examined through phenomenological approaches attentive to lived experience and meaning-making (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

These interpretations can become powerful entry points for entrepreneurship education when entrepreneurship is understood not as business creation, but as situated value creation in response to real problems. Entrepreneurship education has increasingly moved beyond narrow market-oriented approaches toward broader understandings of initiative, creativity, agency, collaboration, and social value creation (FAYOLLE; GAILLY, 2008; LACKÉUS, 2015; NECK; CORBETT, 2018). Under this broader view, entrepreneurial learning may emerge when students identify meaningful problems, interpret their causes, consider the needs of others, and imagine possible forms of collective action.

However, empirical research in entrepreneurship education remains strongly concentrated in higher education and formal entrepreneurship programs. Public high schools, especially those located in socioeconomically vulnerable territories, are still underrepresented in the literature (BERNAL-GUERRERO; CARRILLO-GARCÍA; MORENO-CRESPO, 2024). Moreover, the field has relied heavily on competency frameworks, surveys, and outcome-oriented measures, which often fail to capture the experiential, affective, and interpretative dimensions through which entrepreneurial learning emerges (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018). Students may begin to develop entrepreneurial dispositions not because they were taught a list of competencies, but because an ordinary situation unsettled them, demanded interpretation, and invited action.

This study addresses that gap by examining how students in a Brazilian public high school experienced and reframed food waste as a meaningful educational and entrepreneurial issue. The article draws on the interpretative phenomenological component of a broader applied research project on education for entrepreneurship, sustainability, and school food waste. Although the broader project included the development of a pedagogical-technological artifact, the analytical focus of this article is not the artifact itself. The focus is the students' lived experience: what they saw, felt, interpreted, questioned, and imagined doing in response to food waste in their school. The study was conducted within an entrepreneurship learning track in which students participated in a pedagogical sequence designed to examine food waste as a real school problem.

The guiding research question is: *How do Brazilian public high school students experience, interpret, and reframe food waste as an entrepreneurial learning issue through situated engagement with school meal practices?*

The article makes three contributions. First, it contributes to entrepreneurship education by showing how entrepreneurial learning can emerge from students' interpretation of ordinary institutional problems, rather than from business simulation or venture creation. Second, it contributes methodologically by advancing Interpretative Phenomenological Analysis as a lens capable of capturing moral affect, discomfort, responsibility, and meaning-making in entrepreneurial learning (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

Third, it contributes to sustainability education by showing that food waste can become a pedagogical object when students are invited to narrate, interpret, and act upon experiences embedded in their own school context.

2. Theoretical Background

2.1 Food waste as lived school experience

Research on food waste in schools has traditionally emphasized measurement, menu planning, nutritional adequacy, acceptance of meals, and waste reduction strategies. These approaches are important because they generate evidence about the scale of waste and help identify operational causes related to procurement, preparation, storage, portioning, and menu adaptation. However, this literature often approaches students primarily through consumption patterns, plate waste indicators, and behavioral explanations, leaving their lived interpretations of waste analytically secondary (TRICHES; SCHNEIDER, 2010; PORPINO; PARENTE; WANSINK, 2016).

A phenomenological perspective shifts the analytical focus from measurement to lived meaning. Instead of asking only how much food is wasted or which menu items generate more leftovers, it asks how waste appears to students, what meanings they attribute to it, and how concrete episodes of disposal affect their understanding of responsibility, need, and collective life. In this sense, food waste is not merely an object to be counted; it is an event that students witness, remember, narrate, and reinterpret through their own situated experience (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

The same discarded tray may signify poor menu acceptance, institutional disorganization, lack of time to eat, individual carelessness, or social injustice. These meanings are not given in advance; they emerge through students' interaction with the school meal routine and through the interpretative work they perform when invited to revisit concrete episodes. This is consistent with IPA's concern with how participants make sense of personally meaningful experiences and how researchers interpret that process of meaning-making (SMITH; FLOWERS; LARKIN, 2009).

In public schools located in vulnerable territories, this interpretative dimension becomes particularly significant. School meals may represent essential nutritional support for some students, connecting food provision to food security, school permanence, and the right to adequate nutrition. When food is discarded in this context, waste acquires moral density because it is interpreted against the background of need, inequality, and public responsibility (FNDE, 2020; TRICHES; SCHNEIDER, 2010).

Food waste can therefore be experienced as a contradiction: food is available, yet not valued; the school provides meals, yet the system fails to make them fully meaningful, acceptable, or responsibly consumed. Understanding this contradiction requires attention to students' voices and to the situations through which they encounter waste as part of the school routine. From this perspective, food waste is not only an environmental or managerial issue, but also a lived school experience through which students may begin to articulate responsibility, discomfort, and agency (VAN MANEN, 2016; PORPINO; PARENTE; WANSINK, 2016).

2.2 Entrepreneurial learning beyond business creation

Entrepreneurship education has long been associated with business creation, market opportunity recognition, and venture development. Although these dimensions remain relevant, a broader educational tradition understands entrepreneurship as a way of acting upon the world through initiative, creativity, collaboration, and value creation. In this perspective, entrepreneurial learning is not limited to preparing students

to start businesses; it also involves developing the capacity to identify problems, create value for others, mobilize resources, and act under conditions of uncertainty (FAYOLLE; GAILLY, 2008; LACKÉUS, 2015; NECK; CORBETT, 2018).

This broader understanding is particularly important in public school contexts. Students may not have access to incubators, business laboratories, financial resources, or specialized entrepreneurial ecosystems. Nevertheless, they encounter real problems every day: waste, inequality, infrastructure limitations, environmental degradation, school disengagement, and institutional routines that appear fixed. These problems can become powerful educational situations when students are invited to investigate them, interpret their causes, and imagine collective responses (LACKÉUS, 2015; BACIGALUPO et al., 2016).

Entrepreneurial learning, therefore, may emerge not from artificial simulations but from situated engagement with problems that students recognize as part of their own lives. This position aligns with value-creation approaches, which define entrepreneurship education as a process through which learners create value for others by engaging with real-world problems and stakeholders. Under this view, the educational relevance of entrepreneurship lies not only in economic initiative, but in the development of agency, responsibility, collaboration, and social contribution (LACKÉUS, 2015; STEYAERT; KATZ, 2004).

Food waste offers a strong example of such a problem. It is concrete, visible, measurable, ethically charged, and embedded in school organization. It allows students to connect observation, interpretation, evidence, emotion, and action. When students move from saying “food is wasted” to asking why it is wasted, who is affected, what could be changed, and how students might participate, they begin to enact a form of entrepreneurial learning oriented toward social value (BACIGALUPO et al., 2016; LACKÉUS, 2015).

The emphasis, therefore, is not on enterprise creation, but on the capacity to reframe a routine problem as a field for responsible action. This reframing is central to the argument of the article because it positions entrepreneurial learning as a process of situated meaning-making. Students become entrepreneurial not because they reproduce business tools, but because they learn to interpret a real institutional problem, identify its causes, consider the needs of others, and imagine possible forms of collective intervention (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018).

2.3 Interpretative Phenomenological Analysis and entrepreneurial learning

Interpretative Phenomenological Analysis (IPA) is concerned with how individuals make sense of significant experiences, emphasizing the double hermeneutic through which participants interpret their own experiences while researchers interpret participants’ meaning-making processes. It is particularly useful when the research objective is not to measure attitudes or test predetermined variables, but to understand how participants interpret events that matter to them in concrete contexts of life and action (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

IPA assumes that experience is always mediated by interpretation. Participants seek to make sense of what happened, while researchers engage in a second-order interpretation of that sense-making process. This methodological orientation is appropriate for the present study because the research does not seek to quantify the impact of a pedagogical intervention, but to understand how students experienced food waste, how they narrated significant episodes, and how those episodes became linked to responsibility, agency, and entrepreneurial learning (SMITH; FLOWERS; LARKIN, 2009).

In the context of entrepreneurial learning, IPA offers an important methodological contribution. Much of the literature relies on competency scales, pre- and post-tests, or program evaluations that capture whether students report gains in entrepreneurial intention, self-efficacy, creativity, or problem-solving. These instruments are valuable for certain purposes, but they often miss the processes through which learning becomes meaningful to students in situated, affective, and ethically charged contexts (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018).

Such instruments do not easily capture discomfort, guilt, indignation, surprise, hesitation, identification with others, or the gradual movement from passive observation to responsible agency. Yet these dimensions are central when entrepreneurial learning is understood as more than skill acquisition. They help explain how students come to care about a problem, how they interpret its causes, and how they begin to imagine themselves as capable of contributing to change (SMITH; FLOWERS; LARKIN, 2009; LACKÉUS, 2015).

For this study, IPA is especially appropriate because food waste became meaningful to students through concrete episodes and emotional responses. The phenomenon was not abstract. Students described seeing full trays being discarded, food going to the bin, the rush of the school schedule, portions that were too large or too small, and classmates rejecting meals because of taste or repetition. These descriptions are not secondary details; they are the material through which interpretation occurs (VAN MANEN, 2016; SMITH; FLOWERS; LARKIN, 2009).

IPA allows the analysis to remain close to these accounts while also constructing broader thematic meanings related to entrepreneurial learning. This is important because the article is not concerned merely with whether students acquired predefined competencies, but with how responsibility, initiative, problem framing, and collective agency emerged through students' lived interpretation of food waste. In this sense, IPA supports a more humanized and process-oriented understanding of entrepreneurial learning in public school contexts (SMITH; FLOWERS; LARKIN, 2009; BACIGALUPO et al., 2016).

3. Methodology

3.1 Research design

This article reports the interpretative phenomenological component of a broader qualitative applied research project conducted in a Brazilian public high school. The broader project combined education for entrepreneurship, sustainability, school food waste, and the development of a pedagogical-technological artifact. However, this article does not evaluate the artifact as its primary object. Its focus is students' lived experience of food waste and the interpretative processes through which that experience became associated with responsibility, agency, and entrepreneurial learning, in line with qualitative approaches that prioritize meaning-making, situated interpretation, and contextual depth rather than variable isolation (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016; LINCOLN; GUBA, 1985).

The study adopts a qualitative interpretative design grounded in IPA, which is appropriate for small, purposive samples and for research questions focused on lived experience, meaning-making, and situated interpretation rather than statistical generalization (SMITH; FLOWERS; LARKIN, 2009; LINCOLN; GUBA, 1985). This design was selected because the research sought to understand how students experienced food waste, how they attributed meaning to concrete episodes of disposal, and how they imagined possible forms of action. The study does not aim to establish causal relationships between a pedagogical intervention and reduction in waste. Instead, it examines how students made sense of food waste as part of their everyday school context and how this sense-making process opened space for entrepreneurial learning.

3.2 Research setting

The empirical field was a state public high school located in the municipality of Magé, Rio de Janeiro, Brazil. The school serves students from a socioeconomically vulnerable territory and participates in the Brazilian public education system. At the time of the study, the school did not have a systematic digital mechanism for monitoring food waste, nor did it maintain regular institutional records of food residues produced during school meals. This setting is relevant because school feeding in Brazil is institutionally linked to food security, school permanence, and the public right to adequate nutrition, while waste monitoring remains uneven at the school level (FNDE, 2020; TRICHES; SCHNEIDER, 2010).

The school context was relevant because it combined three conditions central to the study: the social importance of school meals, the everyday visibility of food waste, and the presence of an entrepreneurship learning track in which students could engage with real problems in the school environment. A second public school was involved in the broader project only as a context for technical validation of the pedagogical-technological artifact. Data from that second school are not included in the analytical corpus of this article.

3.3 Participants

The article analyzes 18 in-depth interviews with students aged 16 to 17 enrolled in the second year of high school and participating in an entrepreneurship learning track. The participants were selected because they had direct experience with the school meal routine and had participated in pedagogical activities related to the investigation of food waste. The sample size is consistent with IPA, which prioritizes depth, interpretative richness, and careful engagement with participants' accounts rather than statistical representativeness (SMITH; FLOWERS; LARKIN, 2009).

Interpretative sufficiency was assessed following the IPA principle that sample size is adequate when additional interviews no longer add substantially new meanings to the emerging thematic structure. After the analysis of the fifteenth interview, no substantially new experiential patterns, affective dimensions, or interpretative meanings appeared. The remaining three interviews were analyzed to confirm the stability of the thematic structure, which was maintained. Students are identified through alphanumeric codes to preserve anonymity. The analysis emphasizes the experiential and interpretative quality of their accounts rather than demographic comparison between participants.

To clarify the empirical basis of the study, Table 1 summarizes the data sources used in the article, the participants involved, and the analytical role assigned to each source. Although the broader research project included multiple procedures, the primary corpus analyzed in this article consists of the in-depth interviews conducted with students through the Significant Actions technique. Field notes and food waste records were used only as contextual support, helping situate students' narratives within the everyday school meal routine.

Table 1. Participants and empirical corpus

Data source	Participants / scope	Age range	School context	Analytical use
In-depth interviews using Significant Actions technique	18 students	16–17	Public high school, Magé/RJ	Primary IPA corpus
Field notes	Pedagogical activities and school meal routine	Not applicable	School meal/refectory routine	Contextual support
Food waste records	School-level records	Not applicable	Refectory/school meal routine	Contextual support only

Source: Prepared for this study.

3.4 Pedagogical context of the interviews

The interviews were conducted after students had participated in a pedagogical sequence developed within the entrepreneurship learning track. The sequence consisted of four 50-minute sessions conducted over two weeks and was designed to transform food waste from a routine school occurrence into an object of inquiry, reflection, and collective discussion. Session 1 involved dialogue about school meal practices and initial mapping of students' perceptions of waste. Session 2 included guided observation of the refectory routine, with attention to serving practices, consumption, leftovers, and disposal. Session 3 focused on discussion of concrete

waste episodes and interpretation of possible causes, including menu acceptance, time constraints, portioning, and school organization. Session 4 involved the collective formulation of proposals for improvement, emphasizing student voice, shared responsibility, and possible actions within the school context.

The sequence was facilitated by the researcher, with the regular classroom teacher present but not leading the activities. Its purpose was not to train students to create businesses, but to foster entrepreneurial learning understood as initiative, responsibility, problem framing, collaboration, and social value creation (LACKÉUS, 2015; BACIGALUPO et al., 2016; NECK; CORBETT, 2018). In this article, this pedagogical process is treated as the context that enabled students to revisit their experiences and articulate meanings during the interviews, rather than as an intervention whose effects are causally measured.

3.5 Data generation: the Significant Actions technique

Data were generated through in-depth interviews using the Significant Actions technique, a phenomenologically oriented interview protocol adapted from IPA principles and from phenomenological approaches to lived experience. The protocol was designed to elicit concrete episodes, subjective meanings, affective responses, and projections of action. Rather than asking only for general opinions about food waste, the technique invited participants to reconstruct significant lived situations and to articulate how they interpreted those situations in relation to responsibility, school life, and possible action (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

The technique consisted of six thematic blocks: (1) contextualization of the student's relationship with school meals; (2) narration of a real or memorable situation involving food waste; (3) exploration of institutional, logistical, and social factors involved in the episode; (4) reflection on feelings, meanings, responsibility, and changes in perception; (5) projection of possible entrepreneurial actions; and (6) final reflection on the experience of participating in the research. The central moment of the interview was the narration of a significant episode, which helped prevent the interview from remaining at the level of general opinion and supported the phenomenological aim of returning to lived situations as they were experienced, remembered, and interpreted by participants.

Interviews were audio-recorded with participants' consent and transcribed verbatim. The transcripts were reviewed for accuracy before analysis. When necessary, unclear excerpts were checked against the audio recordings to preserve fidelity to participants' accounts.

3.6 Data analysis

Prior to analysis, the researcher engaged in reflexive bracketing through journaling, documenting personal assumptions about food waste, school meals, student responsibility, and entrepreneurship education. This process did not aim to eliminate interpretation, which is inherent to IPA, but to increase awareness of how the researcher's educational background and professional experience might shape analytical decisions during theme development (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

The analysis followed the main procedures of IPA: close reading of each interview, identification of experiential statements, development of emergent themes, cross-case comparison, and construction of final interpretative themes. This analytical process reflects IPA's idiographic and interpretative commitment, moving from detailed engagement with individual accounts toward cautious cross-case thematic interpretation (SMITH; FLOWERS; LARKIN, 2009). Attention was given to both what students said and how they organized meaning around food waste, school meals, responsibility, and possible action. The analysis also considered affective language, moral judgments, shifts in perspective, and references to institutional conditions.

Although the broader research project included food waste weighing, observation, questionnaires, and digital records, these data were used in this article only as contextual support. This delimitation is consistent with

qualitative rigor, as it preserves methodological coherence between the research question, the primary corpus, and the interpretative claims advanced in the article (LINCOLN; GUBA, 1985; SMITH; FLOWERS; LARKIN, 2009). The primary analytical material was the interview corpus, a choice made to preserve the distinct contribution of the article and avoid overlap with technology-centered analyses of the broader project.

After the final themes were constructed, a recurrence matrix was prepared to map how often key meanings appeared across the 18 interviews. This procedure was not used to transform IPA into a quantitative analysis, but to increase analytical transparency and show the recurrence of meanings across the corpus. The matrix supported the reporting of how many participants mentioned moral discomfort, systemic causes, short meal times, menu acceptance, portioning practices, refectory organization, and student voice.

3.7 Ethical procedures

The study followed ethical procedures applicable to research with human participants in educational settings, including voluntary participation, confidentiality, anonymity, and respect for participants' right to withdraw or not answer questions. These procedures are consistent with ethical principles in qualitative research, particularly when working with young participants and school-based settings (DENZIN; LINCOLN, 2018; LINCOLN; GUBA, 1985). Because the participants were high school students, consent and assent procedures were adopted according to the ethical requirements of the broader research project, and student identities were protected through anonymized codes.

4. Findings

The IPA analysis generated four final themes: (1) food waste as a visible but normalized school event; (2) moral discomfort and the affective rupture of indifference; (3) from individual blame to institutional interpretation; and (4) entrepreneurial learning as emerging responsibility and collective agency. These themes are not presented as isolated categories. Together, they reconstruct an interpretative movement through which students moved from seeing waste as an ordinary feature of the school meal routine to understanding it as a social, ethical, and organizational problem that could be questioned and acted upon.

To strengthen the transparency of the qualitative analysis, the recurrence of key meanings was also mapped across the interview corpus. Of the 18 participants, 16 described some form of moral discomfort associated with discarded food, including guilt, sadness, discomfort, indignation, or concern with classmates who depended on school meals. Fourteen participants identified systemic factors as relevant causes of waste. Among these, short meal times or rushed routines were mentioned by 6 participants, menu repetition or low menu acceptance by 3 participants, portioning practices by 2 participants, and refectory organization or school routine by 4 participants. In addition, 7 participants referred to the need for student voice, participation, or collective projects in addressing the problem. These counts are not treated as statistical indicators, but as a transparency device that shows the recurrence of meanings supporting the IPA themes.

Table 2. Recurrence of key meanings across the interview corpus

Key meaning identified in the interviews	Participants mentioning the meaning	Examples of participant codes	Analytical role in the IPA findings
Moral discomfort associated with discarded food	16/18	P1, P2, P3, P4, P5, P6, P9, P10, P11, P18	Supports Theme 2: moral discomfort and affective rupture of indifference

Key meaning identified in the interviews	Participants mentioning the meaning	Examples of participant codes	Analytical role in the IPA findings
Systemic causes of food waste	14/18	P1, P2, P3, P4, P5, P6, P8, P13, P14, P16, P17	Supports Theme 3: from individual blame to institutional interpretation
Short meal times or rushed school routine	6/18	P1, P2, P3, P8, P14, P16	Explains waste as linked to institutional temporality
Menu repetition or low menu acceptance	3/18	P1, P3, P6	Explains waste as linked to sensory acceptance and meal desirability
Portioning practices	2/18	P3, P5	Explains waste as linked to serving practices
Need for student voice or participation	7/18	P1, P2, P4, P5, P7, P15, P16	Supports Theme 4: collective agency and institutional participation

Source: Prepared for this study.

Note. Counts indicate recurrence of meanings across the interview corpus and are used for analytical transparency, not statistical generalization. Categories are not mutually exclusive.

The four IPA themes indicate a progressive interpretative movement in students' accounts. Food waste first appeared as a visible but normalized feature of the school routine. Through the narration of concrete episodes, however, students began to attribute moral and social meaning to the phenomenon. This process led them to move beyond individual blame and to identify institutional, organizational, and relational factors associated with waste. Figure 1 summarizes this phenomenological pathway, not as a linear causal model, but as an interpretative structure that emerged from the students' narratives.

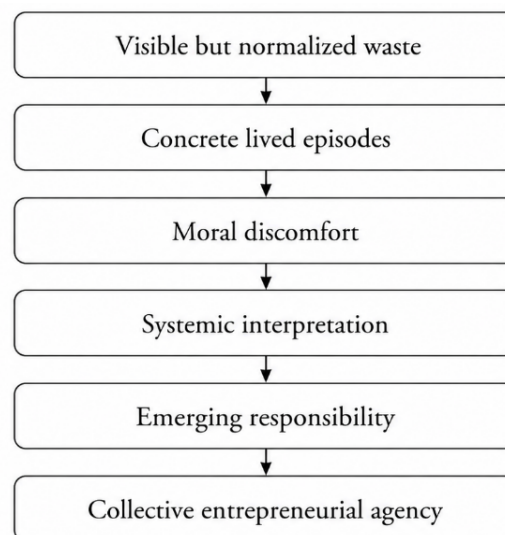


Figure 1. Proposed phenomenological pathway of food waste reframing

Note. The figure represents the interpretative sequence identified in the IPA findings and does not imply linearity or causality.

Table 3 presents the four final IPA themes, their experiential focus, illustrative excerpts, and the corresponding entrepreneurial learning dimension. The table is intended to provide an analytical map of the findings before each theme is discussed in depth. The excerpts were selected because they represent recurrent

meanings across the interview corpus and because they illustrate the movement from lived experience to problem recognition, ethical responsibility, systemic interpretation, and collective agency.

Table 3. Final IPA themes, experiential focus, and entrepreneurial learning dimension

IPA theme	Experiential focus	Illustrative evidence	Entrepreneurial learning dimension
Visible but normalized school event	Waste as part of the ordinary school meal routine	“Waste happens every day” (P10); “I saw several full trays going to the bin” (P1)	Problem recognition
Moral discomfort	Feelings of guilt, discomfort, sadness, and indignation associated with discarded food	“I felt uncomfortable” (P1); “I feel somewhat guilty too” (P10); “It hurts to see food going to the bin” (P18)	Ethical responsibility
Systemic interpretation	Understanding food waste beyond individual blame, including menu acceptance, time, portioning, and school organization	“The time to eat is short” (P1); “The bell rang and everyone rushed out” (P2); “Sometimes too little, sometimes too much” (P5)	Problem framing and systems thinking
Collective agency	Willingness to participate, propose improvements, and contribute to collective change	“I would contribute with ideas” (P1); “I want to help change things” (P10); “If there were a project, I would be in” (P15)	Initiative, collaboration, and social value creation

Source: Prepared for this study.

4.1 Food waste as a visible but normalized school event

The first theme concerns the way students described food waste as something repeatedly seen in the school routine. Waste did not appear in the interviews as an exceptional or rare event. It appeared as part of the ordinary scenery of the refectory: trays with uneaten food, rice being discarded, pans returning with food, and meals abandoned because of the bell, menu rejection, or the rush of the school day. One participant summarized this normalized character directly: “Waste happens every day” (P10). This statement is analytically relevant because it shows that food waste was not hidden from students. It was visible, recurring, and informally recognized.

However, the interviews suggest a distinction between sensory visibility and interpretative visibility. Students saw food waste, but they did not necessarily encounter it as a problem to be investigated. Before the pedagogical process and the interview situation, waste belonged to the background of school life. It was part of what happened after lunch, at the bin, in the queue, or when the bell interrupted the meal. One student recalled: “I saw several full trays going to the bin, it was at lunch, in the refectory. What caught my attention most was the quantity” (P1). Another stated: “I have seen a full pan being taken away” (P5). These accounts reveal that the phenomenon was experienced through concrete scenes rather than through abstract environmental discourse.

The recurrent image of “full trays” is especially significant. It conveys excess, loss, and a visible contradiction between food being offered and food not being consumed. From an IPA perspective, the importance of these statements lies not only in the fact that waste occurred, but in the way students remembered and narrated it. The scene remained available in memory because it carried meaning. Students were not merely reporting a quantity; they were reconstructing a lived episode that had disturbed or impressed them.

This initial theme therefore shows that food waste was both ordinary and potentially disruptive. It was ordinary because students had seen it many times. It was disruptive because, once narrated and interpreted, it

revealed a contradiction in the school routine. Something previously treated as normal began to appear questionable. That shift marks the beginning of reframing.

4.2 Moral discomfort and the affective rupture of indifference

The second theme captures the moral and emotional meanings attributed to waste. Students did not describe discarded food only as inefficient, unpleasant, or poorly managed. They often interpreted it through ethical language. Food waste appeared as wrong, painful, uncomfortable, and socially unjust. One student stated: “Wasting is wrong” (P11). Another described the phenomenon more viscerally: “It hurts to see food going to the bin” (P18). These statements show that waste was not interpreted as a neutral operational failure. It carried moral weight.

This moral weight was intensified by the meaning attributed to school meals. Participants recognized that the meal was important for many classmates. One student stated: “The school meal helps a lot of students who do not eat at home” (P7). Another affirmed: “The meal saves many students” (P11). These statements locate the school meal within a broader social reality marked by inequality and food insecurity. Within this frame, waste becomes more than a matter of discarded food. It becomes a contradiction between public provision and unmet need.

The affective vocabulary used by students is central to the analysis. Participants reported discomfort, guilt, and sadness when describing waste. One student said: “I felt uncomfortable” (P1). Another stated: “I felt bad” (P5). A third participant expressed a more reflexive form of implication: “I feel somewhat guilty too” (P10). These affective responses indicate what can be interpreted as a rupture of indifference. Waste was no longer merely something that happened in the school; it became something that implicated the student as witness, participant, or potential agent of change.

This finding is important for entrepreneurship education because it shows that entrepreneurial learning may begin before ideation, planning, or solution design. It may begin with moral discomfort. The student who feels uncomfortable has already begun to attribute significance to the problem. The student who feels guilt has begun to locate the self within the problem. The student who feels indignation has begun to perceive the problem as socially unacceptable. These are not peripheral emotional reactions. They are the experiential ground from which responsibility and agency may emerge.

4.3 From individual blame to institutional interpretation

The third theme concerns the movement from individual blame toward a more systemic interpretation of food waste. At a superficial level, school food waste could be explained as a result of irresponsible student behavior. Some students did refer to peers who served too much food, played with food, or discarded meals without eating. One participant recalled: “I have seen people playing with food” (P7). This statement indicates that students did recognize behavioral dimensions of waste.

However, the interviews did not remain at the level of moral accusation. Students gradually identified structural, sensory, temporal, and organizational factors that shaped waste. Menu acceptance appeared as a central explanation. One participant observed: “There are days when nobody can stand the food” (P3). Another explained: “When people get tired of it, they waste it” (P2). These accounts suggest that waste cannot be understood only as lack of awareness. It is also produced by the relationship between food offered, taste, repetition, preparation, and students’ sensory acceptance.

Time was another recurrent factor. One student stated: “The time to eat is short” (P1). Another described the same issue through a specific episode: “The bell rang and everyone rushed out” (P2). This interpretation shifts the problem from individual choice to institutional temporality. If the school schedule does not allow sufficient time for eating, part of the waste is produced by the organization of the school day itself. Students also

mentioned refectory organization, including long queues and rushed transitions, as factors that affected consumption.

Portioning practices further reinforced this systemic interpretation. One participant summarized the problem by saying: “Sometimes too little, sometimes too much” (P5). This statement condenses an operational dilemma: waste can be generated not only by the student’s decision to discard food, but also by serving practices that do not correspond to appetite, preference, or available eating time. The student’s interpretation is practical and diagnostic. It identifies a point in the system where intervention might occur.

This movement from blame to diagnosis is central to the article’s argument. Entrepreneurial learning requires problem framing. Students cannot act meaningfully on a problem if they understand it only as an individual moral failure. By identifying menu design, school time, refectory routines, and portioning as contributing factors, participants began to construct food waste as a complex institutional issue. This systemic interpretation is a form of situated entrepreneurial thinking because it identifies causes, actors, constraints, and possible points of intervention.

4.4 Entrepreneurial learning as emerging responsibility and collective agency

The fourth theme shows how students’ interpretations opened space for responsibility, initiative, and collective agency. Participants did not restrict themselves to describing the problem. Many imagined projects, awareness actions, listening mechanisms, changes in serving practices, improvements in refectory organization, and forms of student participation in decision-making. One student stated: “I would contribute with ideas” (P1). Another affirmed: “I want to help change things” (P10). A third participant said: “If there were a project, I would be in” (P15). These statements are modest but significant. They show willingness to move from witnessing to participation.

This form of agency should not be interpreted through a business-oriented definition of entrepreneurship. Students were not proposing ventures, business models, or market opportunities. Their learning was entrepreneurial because it involved identifying a real problem, interpreting its causes, considering the needs of others, and imagining collective responses capable of creating social value. The entrepreneurial element lies in the movement from passive familiarity to active responsibility.

Responsibility also appeared in students’ descriptions of changes in their own consumption practices. One participant stated: “Today I only take what I am going to eat” (P2). Another said: “Today I think more before serving myself” (P6). A third participant summarized the process as a change in perception: “It changed the way I think” (P9). These accounts show that reframing did not remain purely cognitive. It affected the meaning of small gestures in the school meal routine. Serving oneself became an act connected to collective impact.

The role attributed to the school also changed. Students did not see action as an isolated individual responsibility. They emphasized the need for institutional listening and shared organization. One participant argued: “The school could listen to students more” (P1). Another stated: “The school plays an important role” (P17). These statements reveal an important interpretative transition. Responsibility was distributed across students, teachers, school management, food handlers, and institutional routines. Entrepreneurial agency emerged not as individual heroism, but as collective participation in improving a common problem.

The findings indicate that entrepreneurial learning emerged through students’ meaning-making processes rather than through the direct transmission of predefined competencies. Table 4 synthesizes how specific meanings attributed by students to food waste were associated with entrepreneurial competencies such as ethical and sustainable thinking, problem framing, initiative, collaboration, and responsibility. This synthesis does not reduce students’ lived experiences to a competency checklist; rather, it shows how competencies became visible through the interpretation of concrete school situations.

Table 4. From students' lived meanings to entrepreneurial competencies

Students' meaning-making	Evidence in the interviews	Entrepreneurial competence	Interpretation
Waste as injustice	"It hurts to see food going to the bin" (P18); "Wasting is wrong" (P11)	Ethical and sustainable thinking	Students interpreted food waste as a moral and social issue, not merely as an operational failure.
Waste as a systemic school issue	"The bell rang and everyone rushed out" (P2); "The time to eat is short" (P1); "Sometimes too little, sometimes too much" (P5)	Problem framing and systems thinking	Students moved beyond individual blame and identified organizational, temporal, and operational causes of waste.
Students as contributors	"I would contribute with ideas" (P1); "I want to help change things" (P10); "If there were a project, I would be in" (P15)	Initiative and collaboration	Students began to position themselves as participants in collective improvement rather than passive observers.
Self-regulation and responsibility	"Today I only take what I am going to eat" (P2); "Today I think more before serving myself" (P6); "It changed the way I think" (P9)	Responsibility and reflective action	Students connected individual behavior to collective impact, indicating behavioral reorientation and emerging responsibility.
Student voice as institutional participation	"The school could listen to students more" (P1); "The school plays an important role" (P17)	Student voice and civic agency	Students framed waste as a problem that requires dialogue, listening, and shared decision-making within the school.

Source: Prepared for this study.

Taken together, the four themes indicate that food waste was reframed through a phenomenological sequence: students witnessed waste, experienced moral discomfort, interpreted institutional causes, and imagined forms of action. This sequence was neither linear nor identical for all participants, but it reveals how entrepreneurial learning can emerge from lived engagement with an ordinary school problem. In this study, the most important pedagogical transformation was not the production of a technical solution, but the emergence of a new relation between students and their school environment: a relation marked by interpretation, responsibility, and the possibility of collective agency.

5. Discussion

The discussion builds on the four IPA findings to propose an interpretative structure of entrepreneurial learning from lived experience. As shown in Figure 2, the process begins with students' encounter with a concrete school problem and develops through meaning-making, responsibility, and social value orientation. The model highlights that entrepreneurial learning in this context did not originate in business creation or market opportunity recognition, but in students' capacity to interpret an ordinary institutional problem as something that could be questioned, discussed, and transformed (LACKÉUS, 2015; STEYAERT; KATZ, 2004).

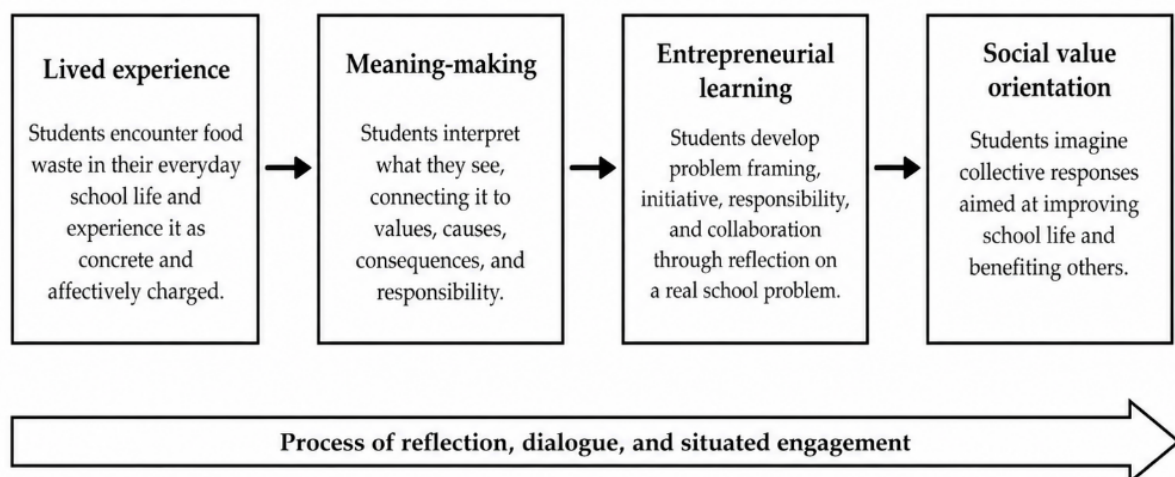


Figure 2. Interpretative structure of entrepreneurial learning from lived experience

Note. The model illustrates how entrepreneurial learning emerges from the interpretation of lived experience and becomes oriented toward social value creation.

5.1 From ordinary visibility to pedagogical problematization

The first finding shows that food waste was already visible to students before it became an object of formal reflection. Participants did not need to be persuaded that waste existed; they had seen full trays, uneaten portions, rice being discarded, and food returning from the refectory. What was absent was not sensory visibility, but pedagogical problematization. Waste was part of the school routine, but it had not yet been interpreted as a collective problem requiring inquiry, explanation, and action. This distinction is consistent with phenomenological approaches that distinguish between the mere presence of an event and the meanings participants attribute to it in lived experience (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

This distinction is central to the contribution of the study. Much of the literature on school food waste treats visibility primarily as a matter of measurement: how much is wasted, when it is wasted, and under which menu conditions. Such measurement is necessary, but it does not explain how students come to experience waste as meaningful (TRICHES; SCHNEIDER, 2010; PORPINO; PARENTE; WANSINK, 2016). In this study, food waste became educationally significant when students were invited to revisit concrete episodes, narrate what they had seen, and interpret the social and moral implications of those experiences.

The pedagogical sequence therefore functioned less as a transmission device than as a context for interpretative activation. By creating opportunities for students to observe, remember, discuss, and question food waste, it allowed an ordinary school routine to become a lived experience with pedagogical meaning. In this movement, problem recognition did not emerge as a purely cognitive act. It emerged from the passage between routine perception and critical attention, through which what had previously been tolerated as normal became available for questioning (SMITH; FLOWERS; LARKIN, 2009; LACKÉUS, 2015).

5.2 Moral affect as the first movement of entrepreneurial learning

The second finding demonstrates that students' relationship with food waste was marked by moral discomfort. Participants used language associated with guilt, sadness, discomfort, indignation, and injustice. This affective response is not secondary to the analysis. It is one of the main mechanisms through which food waste was reframed. Students did not approach the issue only as an environmental topic or a managerial inefficiency; they interpreted it through the moral contradiction between food being discarded and food being socially necessary.

This result is especially relevant in the context of public school meals. When students understand school meals as support, care, and, in some cases, essential food security, waste acquires a different meaning. It is no longer merely the result of poor consumption behavior. It becomes a visible expression of social contradiction. Food is available within the institution, yet it is not fully valued, accepted, or consumed. The discomfort reported by students emerges precisely from this contradiction, reinforcing the social and educational significance of school feeding programs (FNDE, 2020; TRICHES; SCHNEIDER, 2010).

For entrepreneurship education, this finding is important because it shows that entrepreneurial learning may begin with affective disturbance rather than with planned ideation, extending value-creation approaches that understand entrepreneurship as socially situated action rather than merely venture creation (LACKÉUS, 2015; STEYAERT; KATZ, 2004). The first movement toward agency may be the experience of being unsettled by a problem. Before students propose solutions, they must come to care about the issue. Moral affect, in this sense, is not an obstacle to rational problem-solving; it is part of the formation of responsibility.

This challenges approaches that reduce entrepreneurial learning to skills, intentions, or behavioral outputs. The emergence of agency is also ethical and experiential. Students' willingness to act was rooted in what the problem meant to them. Their learning was not simply about knowing that waste is undesirable, but about feeling implicated in a problem that affected their school community. IPA is particularly useful here because it allows affect, memory, discomfort, and meaning-making to be treated as central dimensions of learning rather than as peripheral responses (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

5.3 Systemic interpretation and the maturation of problem framing

The third finding reveals a movement from individual blame toward systemic interpretation. Although some participants recognized irresponsible student behavior as part of the problem, their explanations did not remain confined to moral accusation. They identified menu acceptance, sensory rejection, portioning practices, short meal times, school schedules, and refectory organization as factors shaping waste. This movement is analytically decisive because it indicates the maturation of problem framing.

Entrepreneurial learning requires more than sensitivity to a problem. It requires the capacity to interpret its causes, constraints, actors, and possible points of intervention. When students attributed waste only to individual behavior, the problem remained narrow and moralized. When they began to connect waste to menu repetition, lack of time, portion size, and institutional routines, the problem became more complex and actionable. This shift from blame to diagnosis is one of the clearest signs of entrepreneurial learning in the study and aligns with perspectives that define entrepreneurship education as problem identification, resource mobilization, and value creation in real contexts (LACKÉUS, 2015; BACIGALUPO et al., 2016).

The findings therefore support a broader understanding of entrepreneurial competence. Initiative and creativity do not emerge in a vacuum. They depend on the ability to read the situation. In this case, students demonstrated situated analytical capacity by identifying that waste was produced through interactions between personal choices and institutional arrangements. They were not merely consumers evaluating the quality of school meals; they became interpreters of a system. This interpretative movement expands conventional views of entrepreneurial competence by emphasizing situated judgment and contextual diagnosis (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018).

This point also has implications for sustainability education. Environmental education often risks becoming moralistic when it tells students what they should do without helping them understand the structures that shape behavior. The students' accounts suggest that sustainable action becomes more meaningful when learners can connect individual practices to organizational conditions. Food waste, then, is not reduced to "students throwing food away." It becomes a shared institutional phenomenon involving time, taste, routines, participation, and decision-making (TRICHES; SCHNEIDER, 2010; PORPINO; PARENTE; WANSINK, 2016).

5.4 Student voice, agency, and social value creation

The fourth finding shows that students' interpretations opened space for responsibility, initiative, and collective agency. Participants imagined awareness projects, listening mechanisms, improvements in serving practices, changes in the refectory routine, and greater student participation. These projections show that the experience of waste was not limited to perception or complaint. It generated a movement toward possible action.

This is where the entrepreneurial dimension of the study becomes most visible. However, it is not entrepreneurship understood as business creation. It is entrepreneurship as social value creation. Students identified a problem embedded in their own school, interpreted its causes, considered the needs of others, and imagined collective responses. Their agency was not individualistic or market-oriented; it was relational, situated, and directed toward the improvement of a shared environment (LACKÉUS, 2015; STEYAERT; KATZ, 2004).

The emphasis on student voice is particularly important. Several participants suggested that the school should listen more to students. This indicates that food waste was also interpreted as a participation problem. Students did not see themselves only as recipients of school meals, but as actors capable of contributing ideas about the organization of the meal routine. In this sense, the study shows that entrepreneurial learning in public schools can be closely connected to democratic participation and civic agency. To act entrepreneurially is not only to create something new, but to claim a legitimate place in the interpretation and transformation of institutional life (BACIGALUPO et al., 2016; NECK; CORBETT, 2018).

The findings also show that agency emerged at two levels. At the personal level, students reported thinking more before serving themselves and taking only what they intended to eat. At the collective level, they imagined projects and institutional changes. This double movement is pedagogically relevant because it avoids both individualization and abstraction. Students did not simply blame the system, nor did they reduce the problem to personal responsibility. They began to understand that change requires both individual reorientation and collective organization.

5.5 Policy implications for school feeding programs

From a policy perspective, the findings suggest that school feeding programs should not address food waste only as an operational, nutritional, or procurement issue. In the Brazilian context, the PNAE provides an important institutional framework for guaranteeing food security, nutritional adequacy, and procurement from family farming (FNDE, 2020; TRICHES; SCHNEIDER, 2010). However, the findings indicate that students also experience food waste as a moral, organizational, and participatory issue. This suggests that PNAE implementation could be strengthened by including mechanisms for student voice in menu planning, portioning decisions, refectory organization, and waste monitoring.

A practical recommendation arising from this study is the creation or strengthening of school meal committees with student participation, particularly in secondary education. Such committees could help transform school meals from a service delivered to students into a shared educational space in which students contribute to identifying causes of waste, discussing menu acceptance, proposing improvements, and monitoring collective practices. This recommendation does not replace the nutritional, sanitary, and procurement dimensions of PNAE; rather, it complements them by recognizing students as interpreters and co-participants in the school meal routine.

5.6 The contribution of IPA to entrepreneurship education research

The use of Interpretative Phenomenological Analysis allowed the study to access dimensions of entrepreneurial learning that would be difficult to capture through outcome-based instruments alone, particularly because IPA is designed to examine how participants make sense of personally meaningful experiences (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016). Conventional measures might identify whether students

became more aware of food waste or more willing to participate in sustainability actions. They would be less capable of explaining how a remembered scene of disposal became morally significant, how guilt or discomfort contributed to reflection, or how students moved from witnessing waste to imagining themselves as participants in change.

The findings suggest that IPA is particularly useful for entrepreneurship education research because it captures the lived process through which agency is formed. Entrepreneurial learning is often treated as a set of competencies to be acquired, measured, and compared. This study shows that such competencies also emerge through meaning-making. Initiative, responsibility, collaboration, and problem-solving were not abstract traits. They appeared within students' attempts to understand a concrete situation that mattered to them (SMITH; FLOWERS; LARKIN, 2009; LACKÉUS, 2015).

This methodological contribution is important because it expands the analytical vocabulary of the field. Entrepreneurial learning can be studied not only through intention, self-efficacy, or competence development, but also through memory, affect, interpretation, discomfort, and ethical positioning. These dimensions are especially relevant in school contexts where entrepreneurial education is not oriented toward venture creation, but toward students' capacity to engage critically with real problems in their environment (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018).

IPA also helps avoid a common limitation in educational intervention research: the temptation to attribute change too quickly to a method, program, or tool. By centering students' lived experience, the analysis shows that learning is mediated by the meanings students construct. What matters is not only what was implemented, but how students experienced, interpreted, and incorporated the problem into their understanding of themselves and their school. This methodological stance reinforces the interpretative rather than causal nature of the article's contribution (SMITH; FLOWERS; LARKIN, 2009; LINCOLN; GUBA, 1985).

5.7 Public high schools as legitimate sites of entrepreneurial learning

The study also contributes to the discussion about where entrepreneurship education can occur. Public high schools, particularly those located in vulnerable territories, are often approached through deficit narratives: lack of infrastructure, lack of resources, lack of digital systems, lack of institutional autonomy. These constraints are real, but the findings show that such contexts also contain powerful pedagogical possibilities. The daily problems of school life can become legitimate sites of entrepreneurial learning when students are invited to interpret and act upon them (BERNAL-GUERRERO; CARRILLO-GARCÍA; MORENO-CRESPO, 2024; LACKÉUS, 2015).

Food waste was powerful precisely because it was close, concrete, and socially meaningful. Students did not need to imagine a distant problem or simulate an artificial entrepreneurial challenge. They engaged with something they saw in their own refectory. This proximity gave the learning process existential and educational density. The problem was not imported into the classroom; it emerged from the school itself. Such situated engagement reinforces the view that entrepreneurial learning can occur through real problems and value creation in everyday institutional contexts (LACKÉUS, 2015; STEYAERT; KATZ, 2004).

This finding supports a broader and more democratic conception of entrepreneurship education. If entrepreneurial learning is understood as the capacity to create value in response to real problems, then public schools are not secondary or deficient spaces for entrepreneurship education. They are central spaces. They expose students to complex social, environmental, and organizational issues that can be transformed into learning opportunities. The challenge is not to reproduce business school models in secondary education, but to recognize the entrepreneurial potential of situated school problems (FAYOLLE; GAILLY, 2008; NECK; CORBETT, 2018).

5.8 Synthesis: food waste reframing as entrepreneurial meaning-making

Taken together, the four findings show that food waste reframing occurred through an interpretative sequence: students witnessed waste as part of routine school life; they experienced moral discomfort; they moved from individual blame to systemic interpretation; and they began to imagine forms of personal and collective action. This sequence does not represent a fixed model or a universal pathway, but it offers a theoretically useful explanation of how entrepreneurial learning can emerge from lived school experience (SMITH; FLOWERS; LARKIN, 2009; VAN MANEN, 2016).

The central contribution of the article is therefore to show that entrepreneurial learning can be understood as a process of meaning-making. Students became more entrepreneurial not because they learned business techniques, but because they learned to reinterpret an ordinary institutional problem as something that could be questioned, discussed, and transformed. Their agency emerged from the intersection of lived experience, moral affect, systemic interpretation, and collective imagination (LACKÉUS, 2015; STEYAERT; KATZ, 2004).

This interpretation advances entrepreneurship education beyond the business frame. It shows that the field can contribute to sustainability education, public school pedagogy, and civic formation when it is grounded in real problems and attentive to students' lived experiences. In the context examined here, food waste became more than residue. It became a pedagogical event through which students began to understand themselves as capable of responsibility, judgment, and action within their school community (FAYOLLE; GAILLY, 2008; BACIGALUPO et al., 2016).

6. Conclusion

This study examined how Brazilian public high school students experienced, interpreted, and reframed food waste as an entrepreneurial learning issue. Drawing on Interpretative Phenomenological Analysis of 18 in-depth interviews, the article showed that food waste was initially experienced as a visible but normalized part of the school routine. Through narration and reflection, however, concrete episodes of disposal became morally significant. Students expressed discomfort, guilt, sadness, and indignation, particularly when waste was interpreted in relation to the social importance of school meals.

The findings demonstrate that students did not understand food waste solely as individual irresponsibility. They identified menu acceptance, short meal times, portioning practices, school organization, and lack of student voice as factors shaping the problem. This movement from blame to systemic interpretation created conditions for entrepreneurial learning. Students began to imagine projects, propose improvements, and reposition themselves as participants in collective change.

The article contributes to entrepreneurship education by showing that entrepreneurial competencies can emerge from lived encounters with ordinary institutional problems in public school contexts. It contributes methodologically by demonstrating the value of IPA for capturing affective, ethical, and interpretative dimensions of entrepreneurial learning that are often missed by outcome-based instruments. It also contributes to sustainability education by showing that food waste can be transformed from a routine school residue into a pedagogical object of inquiry, responsibility, and action.

The study has limitations. It is based on a single public school context and on a qualitative interpretative corpus, which means that findings are not statistically generalizable. However, in qualitative inquiry, the relevant criterion is not statistical generalization but transferability, understood as the possibility of applying insights to contexts with similar social, institutional, and educational characteristics (LINCOLN; GUBA, 1985). The analysis does not establish causal links between pedagogical activities, technological mediation, and behavioral change. A further limitation concerns the double hermeneutic inherent to IPA. While the approach allows deep access to participants' meaning-making, it also introduces the researcher's interpretative frame as an unavoidable analytical filter. Different researchers might have emphasized different affective dimensions or constructed

alternative thematic structures from the same interview corpus. The study mitigated this limitation through systematic cross-case analysis, recurrence mapping of key meanings, and sustained reflexivity during data analysis. Nevertheless, the findings should be interpreted as analytically constructed interpretations of students' lived experiences rather than as objective representations of those experiences.

Future research could compare students' lived experiences across different schools, examine longitudinal changes in entrepreneurial agency, and explore how phenomenological methods can be combined with design-based or participatory approaches in sustainability-oriented education.

By foregrounding lived experience, the article shows that entrepreneurial learning in public schools is not only a matter of competence acquisition, but also a process of ethical and interpretative positioning toward real problems. Ultimately, the study suggests that entrepreneurship education becomes most powerful when it begins not with abstract competencies, but with lived problems that students recognize as meaningful. In the context examined here, food waste became such a problem: it unsettled students, invited interpretation, and opened a path toward responsibility and collective agency.

Declarations

Contribuição de autoria

Sany da Silva Motta: conceptualization; investigation; methodology; data curation; formal analysis; writing – original draft; writing – review and editing; visualization.

Ricardo César da Silva Guabiroba: supervision; conceptualization; methodology; formal analysis; validation; writing – review and editing.

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Research Data Availability Statement

The empirical data supporting this study are not publicly available because they involve underage students and contain potentially sensitive information whose disclosure could permit indirect identification. Anonymised materials may be considered upon reasonable request to the corresponding author, subject to the consent and assent terms and to applicable ethical, legal and institutional requirements.

Ethics statement

This study derives from a research project involving pedagogical intervention and data collection with human participants. The project was submitted to the Research Ethics Committee of the responsible institution and was conducted in accordance with Brazilian ethical standards for research involving human participants, particularly Resolutions No. 466/2012 and No. 510/2016 of the Brazilian National Health Council. Institutional authorisation for conducting the research in the public-school context was granted through administrative process SEI-030001/002086/2026.

Ethical procedures aimed at protecting participants' autonomy, confidentiality and rights were ensured. Free and Informed Consent Forms were applied to adult participants involved in the research. When applicable, assent forms and consent forms signed by legal guardians were used for underage students. Anonymity and confidentiality of the collected information were guaranteed, as well as the participants' right to withdraw from the research at any time without any prejudice.

Preprint and Prior Dissemination Statement

Preliminary and partial analyses from this research programme were made available without peer review in three preprints with distinct emphases: food-waste reframing and entrepreneurship education, DOI 10.21203/rs.3.rs-9612438/v1; data-mediated entrepreneurship education for sustainability, DOI 10.21203/rs.3.rs-9657085/v1; and data-mediated learning through an educational artefact, DOI 10.21203/rs.3.rs-9791777/v1. The present manuscript derives from the same project and empirical field but has been substantially reconceptualised and fully rewritten around the development of the MFTS as a distinct theoretical contribution.

Conflict of interest

The authors declare that they have no relevant financial or non-financial interests to disclose.

Use of AI-assisted tools

AI-assisted text revision was used only to improve readability, language, formatting, translation refinement and editorial consistency. The tool was not used as a research method, did not generate empirical data, did not conduct autonomous analysis, did not produce or verify references independently, and did not replace the authors' theoretical interpretation or methodological judgement. All suggestions produced with AI assistance were reviewed, edited and validated by the authors. The authors take full responsibility for the manuscript's content, accuracy, integrity and originality. ChatGPT is not listed as an author.

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ANEXO - RESUMO DA BIOGRAFIA DOS AUTORES

Sany da Silva Motta

Mestranda em Administração pelo Programa de Pós-Graduação em Administração da Universidade Federal Fluminense - PPGA/UFF (tipo de vínculo: discente). Professora da rede estadual de ensino do Rio de Janeiro e coordenadora de Gestão e Integração da Regional Serrana I da SEEDUC/RJ (tipo de vínculo: servidora pública estadual). Pesquisa educação para o empreendedorismo, sustentabilidade e tecnologia educacional.

Ricardo César da Silva Guabiroba

Doutor e professor do Departamento de Administração da Universidade Federal Fluminense, vinculado ao Programa de Pós-Graduação em Administração - PPGA/UFF (tipo de vínculo: docente). Desenvolve atividades de ensino, pesquisa, orientação e supervisão acadêmica, com atuação em Administração de Operações e Logística Integrada.

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