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FOOD WASTE REDUCTION AMONG SECONDARY STUDENTS: BEHAVIORAL INSIGHTS FROM SELECTED SCHOOLS IN SURIGAO DEL SUR

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ABSTRACT

This descriptive investigation assessed the practices, intentions, perceived behavioral control, subjective norms, attitudes, and awareness concerning food waste reduction among learners in chosen secondary educational institutions. These schools were situated within Madrid, Cantilan, and Carrascal municipalities, all in the province of Surigao del Sur. Using a structured questionnaire, data were collected from 100 participants to assess their knowledge and behavioral factors influencing food waste management. The findings suggested a generally elevated understanding and favorable dispositions regarding food waste reduction. Notably strong among the participants were their intentions to participate in sustainable practices and perceived behavioral control. While students demonstrated active participation in waste reduction and reuse behaviors, recycling practices were less frequently observed, highlighting areas for targeted intervention. These outcomes highlight the essential part that educational organizations play in cultivating environmentally sound food handling habits. They also indicate a necessity for improved hands-on training and better infrastructure to facilitate thorough food waste reduction initiatives. This research aids in progressing the sustainable development objectives related to responsible production and consumption by encouraging understanding and practical actions among younger students.

KEYWORDS: food waste reduction, sustainable behavior, Theory of Planned Behavior, student practices, responsible consumption

INTRODUCTION

The problem of food waste represents a pressing worldwide concern that substantially impedes progress toward environmentally sound development. This issue presents considerable social, environmental, and economic difficulties. The Food and Agriculture Organization (FAO) indicates that around one-third of all food intended for individual consumption is discarded yearly. This wastage contributes significantly to greenhouse gas emissions, food insecurity, and resource depletion (Gustavsson et al., 2011). This specific concern is especially pertinent for developing areas, given that effective food management practices are essential to combat hunger and poverty (aligned with SDG 2: Zero Hunger) while also advancing principles of responsible production and consumption (SDG 12) (Papargyropoulou et al., 2014).

Despite increasing awareness of food waste's impact, practical implementation of waste reduction strategies remains uneven, especially among young populations involved in food handling and preparation, such as students enrolled in Technical-Vocational-Livelihood (TVL) Cookery programs. These students represent a key demographic that can influence household and community food practices but often face challenges, including limited knowledge, insufficient behavioral motivation, and inadequate institutional support (Quested et al., 2013; Principato et al., 2020).

The complexity of food waste behavior is well-explained by the Theory of Planned Behavior (Ajzen, 1991), which identifies attitudes, knowledge, perceived behavioral control, and social norms as key determinants of intentions and practices. Studies have demonstrated that enhancing self-efficacy and social normative support can effectively improve sustainable food management behaviors (Visschers et al., 2016; Graham-Rowe et al., 2015). However, gaps persist in translating awareness into consistent practice, particularly in food storage and recycling behaviors, which are critical intervention points (Stancu et al., 2016).

In the context of Surigao del Sur, where food technology and cookery education are integrated into the senior high school curriculum, there is a compelling need to assess the current state of attitudes, knowledge, intentions, and actual practices associated with food waste among TVL Cookery students. Understanding these factors is essential to designing targeted educational programs that raise awareness and foster effective behavioral change, thereby contributing to local and global sustainability goals.

This study seeks to provide a thorough descriptive analysis of food waste-related behaviors among TVL Cookery students in the municipalities of Carrascal, Cantilan, and Madrid. The findings will inform educators and policymakers on priority areas for intervention, ultimately supporting the Philippines' commitment to sustainable food systems and environmental stewardship.

METHODOLOGY

This study utilized a descriptive research design to assess the awareness, subjective norms, attitudes, perceived behavioral control, intentions, and practices related to food waste management among TVL Cookery students. The design facilitated a detailed understanding of the current state of these variables within the target population. The research was conducted in selected senior high schools offering the TVL Cookery strand within the municipalities of Carrascal, Cantilan, and Madrid in Surigao del Sur. These schools were chosen for their relevance to food waste management due to the direct participation of students in food preparation activities.

100 Grade 11 and 12 TVL Cookery students were purposively selected as respondents, ensuring they had direct experience in food handling and were enrolled during the academic year of the research. Data were collected using a structured questionnaire divided into six sections, each corresponding to the constructs of the Theory of Planned Behavior: knowledge, subjective norms, attitude, perceived behavioral control, practices, and intentions regarding food waste management. Responses were evaluated using a 5-point Likert scale to quantify levels of agreement and frequency of behaviors.

Before administration, experts validated the questionnaire for content and clarity and pilot-tested on a small sample outside the study population. Approval from the relevant school administrators for ethical conduct was obtained, and all individuals involved provided their informed consent. The importance of confidentiality and willing engagement was stressed. Survey instruments were made available in paper and electronic versions, according to the respondents' preference. For data analysis, descriptive statistical methods, such as mean and standard deviation, were employed to outline the participants' degrees of awareness, attitudes, behaviors, and intentions concerning food waste management.

RESULTS AND DISCUSSION

Table 1. Extent of Food Waste Management Implementation

Indicator	Statements	Mean Score	Interpretation
Reduce	Avoid buying excess ingredients	3.88	Agree
	Plan meal portions carefully to minimize leftovers	3.82	Agree
	Store food properly to prevent spoilage	3.90	Agree
	Use only the required amount of ingredients	3.85	Agree
	Check expiration dates before purchasing	3.80	Agree
	Use food nearing expiration first	3.75	Agree
	Avoid wasting edible parts of food	3.70	Agree
Mean		3.81	Agree
Reuse	Use leftover food creatively in new dishes	3.60	Agree
	Repurpose vegetable scraps for broth	3.55	Agree
	Save unused ingredients for later use	3.65	Agree
	Use reusable containers for storing food	3.70	Agree
	Reuse packaging materials when possible	3.50	Agree
	Share excess food with others	3.45	Agree
	Use leftover food and make new viands	3.55	Agree
Mean		3.57	Agree
Recycle	Separate organic waste from other trash	3.40	Agree
	Compost food scraps at home or school	3.35	Slightly Agree
	Participate in school recycling programs	3.45	Slightly Agree
	Use biodegradable bags for food waste	3.30	Slightly Agree
	Donate unused food to recycling centers	3.25	Slightly Agree
	Recycle food packaging materials properly	3.50	Agree
	Educate peers on benefits of recycling food waste	3.40	Agree
Mean		3.37	Slightly Agree

Legend: 4.21 – 5.00: Strongly Agree 3.41 – 4.20: Agree 2.61 – 3.40: Slightly Agree 1.81 – 2.60: Disagree 1.00 – 1.80: Strongly Disagree

The findings in Table 1 reveal that TVL Cookery students demonstrated a generally positive level of implementation regarding food waste control, particularly in Reduce, with an overall mean score of 3.81, interpreted as "Agree." Students reported actively avoiding excess ingredient purchases, careful meal portion planning, proper food storage, and using food nearing expiration first. These practices align with recommendations in the literature emphasizing that minimizing food loss and waste (FLW) generally improves resource efficiency, and the environmental outcome depends on where the reduction occurs throughout the supply chain (Cattaneo et al., 2020). Recent studies highlight the potential of educational interventions to minimize food waste in schools and households. School-

based programs can positively influence students' food waste behaviors and sustainability practices (Boulet et al., 2022).

Transitioning to the Reuse indicator, students also showed a positive implementation level with a mean of 3.57, reflecting agreement with reuse practices. These included repurposing leftover food into new dishes, saving unused ingredients, and using reusable containers. This finding echoes the work of Rujnić-Sokele and Pilipović (2017), who highlighted reuse as a critical intermediate step in food waste management that extends food utility and reduces disposal volume. Encouraging reuse among students fosters practical skills for food conservation and responsible consumption, which can be directly translated into community behavior, enhancing local food security and sustainability.

In contrast, the Recycle dimension received a slightly lower mean score of 3.37, indicating a "Slightly Agree" level of practice. While students demonstrated some engagement in separating organic waste and recycling food packaging, practices such as composting and participation in recycling programs were less frequent. This suggests a gap between awareness and full implementation of recycling behaviors, a common challenge observed in studies assessing young populations (Magnusson et al., 2020; Thyberg & Tonjes, 2016). The relatively lower engagement in recycling may be attributed to limited access to recycling facilities or insufficient institutional support within schools. This underscores the need for enhanced educational initiatives and infrastructure development to promote comprehensive food waste recycling (Papargyropoulou et al., 2014).

The overall positive responses toward reduction and reuse and moderate recycling practices imply that TVL Cookery students are reasonably aware of food waste management's environmental and social implications. However, to strengthen sustainable behavior fully, educational programs should emphasize the importance of the entire waste hierarchy, particularly reinforcing recycling and composting practices (FAO, 2019). Such initiatives could enhance students' environmental stewardship and contribute to broader community sustainability goals.

Table 2. Descriptive Summary of Food Waste-Related Knowledge, Attitudes, Norms, Control, Intentions, and Practice

Indicator	Statements	Mean Score	Interpretation
Knowledge	I understand the causes and effects of food waste.	3.85	Strongly Agree
	I am aware of methods to reduce food waste.	3.78	Agree
	I know how to preserve food properly to avoid spoilage.	3.80	Agree
	I am aware of the environmental impact of food waste.	3.88	Strongly Agree
	I understand policies or guidelines on food waste.	3.70	Agree
	I know about community programs related to food waste.	3.65	Agree
	I am aware of food donation and recycling options.	3.72	Agree
Mean		3.76	Agree
Attitude	I believe it is important to reduce food waste.	3.92	Agree
	I have positive feelings towards sustainable food practices.	4.00	Agree
	I feel motivated to participate in reducing food waste.	3.92	Agree
	I am willing to change my habits to reduce food waste.	3.85	Strongly Agree
	I care about how food waste impacts my community.	3.88	Agree
	I support school programs on food waste management.	3.90	Agree
	I want to educate others about food waste issues.	3.87	Agree
Mean		3.90	Agree
Subjective Norms	I think my peers support reducing food waste.	3.70	Agree
	My family's habits influence how I manage food waste.	3.88	Agree
	My teachers encourage me to control food waste.	3.70	Strongly Agree
	I feel social approval when I reduce food waste.	3.65	Agree
	My community expects me to manage food waste properly.	3.72	Agree
	My peers encourage me to reuse or recycle food.	3.85	Agree
	School campaigns influence my behavior on food waste.	3.92	Agree
Mean		3.77	Agree
Perceived Behavior	I am confident I can reduce food waste effectively.	3.92	Agree
	I find it easy to practice food waste reduction.	3.85	Agree
	I have resources available to manage food waste.	3.88	Agree
	I believe my actions can impact food waste	4.34	Strongly Agree

al Control	reduction.		
	I control how much food I portion and store.	3.85	Agree
	I can participate in school food waste programs.	3.92	Agree
	I have access to information on effective waste management.	3.90	Agree
Mean		3.95	Agree
Intention s	I plan to reduce food waste in my cooking activities.	3.70	Agree
	I intend to reuse leftovers creatively.	3.65	Agree
	I am committed to separating and recycling food waste.	3.72	Agree
	I want to educate my peers about food waste.	3.85	Agree
	I plan to join food waste reduction events.	4.40	Strongly Agree
	I intend to advocate for sustainable food management.	3.82	Agree
	I support school and community food waste initiatives.	4.22	Agree
Mean		3.90	Agree
Practices	I reduce food waste when I cook.	3.70	Agree
	I regularly reuse leftover food.	3.65	Agree
	I participate in recycling and composting food waste.	3.72	Agree
	I share excess food with others.	4.11	Agree
	I check expiration dates consistently.	4.04	Agree
	I store food properly to minimize spoilage.	3.18	Agree
	I take part in food waste awareness activities.	4.13	Strongly Agree
Mean		3.79	Agree

Legend: 4.21 – 5.00: Strongly Agree 3.41 – 4.20: Agree 2.61 – 3.40: Slightly Agree 1.81 – 2.60: Disagree 1.00 – 1.80: Strongly Disagree

The results of Table 2 reveal that participants demonstrated a generally high level of awareness and favorable disposition toward food waste reduction, as reflected in the overall mean scores across all measured domains: Knowledge ($\bar{x} = 3.76$), Attitude ($\bar{x} = 3.90$), Subjective Norms ($\bar{x} = 3.77$), Perceived Behavioral Control ($\bar{x} = 3.95$), Intentions ($\bar{x} = 3.90$), and Practices ($\bar{x} = 3.79$). These findings support the theoretical assumptions of the Theory of Planned Behavior (Ajzen, 1991), which posits that knowledge, attitude, perceived norms and perceived behavioral control significantly shape behavioral intentions and practices.

Regarding knowledge, participants agreed with most of the statements, indicating a firm grasp of the causes and consequences of food waste, with the highest agreement observed on the awareness of environmental impacts ($\bar{x} = 3.88$). This is associated with the findings by Principato et al. (2020), who emphasize that environmental literacy strongly correlates with proactive behavior toward reducing food wastage. While participants were aware of food preservation, donation, and policy guidelines, slightly

lower mean scores on knowledge about community programs ($\bar{x} = 3.65$) suggest a potential gap in local program dissemination or participation.

Participants strongly agreed with statements regarding their attitude toward food waste reduction (overall $\bar{x} = 3.90$), with the highest mean score observed in having positive feelings towards sustainable practices ($\bar{x} = 4.00$). This reflects the growing normative support for sustainability in educational contexts, as noted in the work of Filimonau and Gherbin (2017), which underscores that positive affective orientation significantly predicts environmentally responsible food behavior.

The mean score of 3.77 in subjective norms indicates that respondents perceive moderate to strong social influence in shaping their food waste behavior. The highest item score under this domain was attributed to the influence of school campaigns ($\bar{x} = 3.92$), suggesting that institutional efforts in raising awareness can significantly affect student behavior. These findings are consistent with the study of Stefan et al. (2013), which highlighted that social expectations and perceived behavioral norms strongly drive food management behavior, especially among youth. The highest overall mean among all domains ($\bar{x} = 3.95$) was recorded concerning perceived behavioral control. Participants strongly agreed that their actions could significantly impact food waste reduction ($\bar{x} = 4.34$), indicating high self-efficacy. This confirms the assertion of Visschers et al. (2016) that perceived control and confidence are strong predictors of intention and actual behavior toward waste minimization.

Participants' intentions to reduce food waste also showed a high mean ($\bar{x} = 3.90$), with strong agreement in planning to join food waste reduction events ($\bar{x} = 4.40$) and supporting school/community initiatives ($\bar{x} = 4.22$). These findings resonate with Graham-Rowe et al. (2015), who found that concrete behavioral intentions are critical antecedents of sustained food waste mitigation practices, particularly when tied to community engagement.

Regarding actual practices, the overall mean score ($\bar{x} = 3.79$) affirms that participants translate their knowledge and intentions into behavior. The highest mean in this domain was participation in awareness activities ($\bar{x} = 4.13$) and sharing excess food ($\bar{x} = 4.11$). However, it is noteworthy that the lowest score among all practice-related items was observed in food storage to prevent spoilage ($\bar{x} = 3.18$), indicating a critical area for intervention. According to Stancu et al. (2016), poor food storage practices are a key contributor to household-level food waste, often due to insufficient knowledge or neglect in applying preservation techniques.

These findings suggest that while there is a high level of awareness and a positive disposition toward food waste reduction among students, gaps still exist in operationalizing such knowledge, particularly in the practical domain of food storage. Educational institutions can leverage these insights by enhancing

targeted interventions, such as skills-based workshops on food preservation and partnerships with community food recovery programs. Furthermore, strengthening the implementation of school-based campaigns and incorporating behavioral change models into the curriculum may increase students' self-efficacy and practical competencies in minimizing food waste.

CONCLUSION

This research reveals that students exhibit a generally high level of awareness, positive attitudes, and strong behavioral intentions toward food waste reduction. Consistent agreement across knowledge, subjective norms, attitude, intentions, perceived behavioral control, and actual practices indicates the participants' well-developed understanding and commitment to sustainable food management. In particular, students demonstrated strong confidence in influencing food waste outcomes and actively participated in related initiatives. Their positive orientation toward sustainable practices suggests a readiness to translate awareness into meaningful action. However, specific areas such as food storage and recycling remain underdeveloped, indicating practical gaps that require further attention.

Implementing the 3Rs—Reduce, Reuse, and Recycle—also reflects a progressive engagement, with reduction practices most consistently applied, followed by reuse, while recycling practices were moderately observed. These results suggest that while the foundational elements of sustainable behavior are in place, there is room for improvement in comprehensive waste management habits.

The study highlights the effectiveness of food waste education in shaping responsible behaviors among students. It also emphasizes the need for tailored interventions that focus on practical skill development, enhanced institutional support, and sustained environmental programs to address remaining challenges and reinforce a philosophy of sustainability within the educational setting.

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