Written Messages Improve Edible Food Waste Behaviors in a University Dining Facility

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ABSTRACT

Background Sustainability and going green have become popular trends among foodservice organizations. Despite this interest, foodservice operations still produce large amounts of edible food waste and contribute significantly to waste management problems.

Objective The purpose of this operational study was to determine how to introduce food waste behavior change into a dining facility using a simple message-type intervention that requires little sustained administrative support and can provide optimum effect.

Design The population for this study was 540 university students living in residence halls and participating in a meal plan. This study assessed whether simple prompt-type message interventions had an influence or if the addition of more personally relevant feedback-based data elicited greater change in student beliefs and food waste behaviors. A written questionnaire and individual student tray waste tracking were used to gather data. Simple print-format messages were evaluated, allowing the effect of an affordable message campaign to be determined.

Results Students had a higher-than-neutral level of belief, but did not indicate a strong conviction toward environmental sustainability or food waste. The edible food items disposed of on 19,046 trays in this all-you-care-to-eat university dining operation were evaluated. On average, more than 57 g edible food was disposed of per tray, accumulating to >1.5 tons of food waste during the 6-week study. The simple to-the-point prompt-type message stimulated a 15% reduction in food waste. The addition of a more personalized feedback-based message did not stimulate an additional change beyond that of the prompt message.

Conclusions These findings indicate that simply making university students aware of the topic of food waste may be useful in improving their behaviors and the sustainability of the foodservice facility.

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TODAY ONE OF THE MOST PRESSING ISSUES FACING society is to decrease our effect on the environment, including reducing our carbon footprint and using our resources more efficiently. Sustainability, or the ability to meet our needs without limiting the ability of future generations to meet their needs, is part of this process. And food is one of these resources.

Despite this fact, nearly 14% of the meats, grains, fruits, and vegetables in households are disposed of.[1] Commercial and retail food operations, including university dining centers, are major contributors to the vast amounts of food waste being generated in our nation each year. Nearly 54 billion pounds of food is disposed of annually by these operations.[1] Food waste generated by universities each year is estimated at nearly 540,000 million tons.[2] Overproduction, poor inventory management, and fluctuation in sales all contribute to commercial food loss. Consumers also play a role in retail operations' waste.

These amounts of food waste are staggering to comprehend and create additional challenges for foodservice operators and local and state governments. Transportation of waste to landfills, processing waste into the sewer system through garbage disposals, composting, and animal feed are the primary methods of food waste disposal in the United States. Although these methods have their merits, they also have limitations and some negative results.[3-6]

The world population continues to grow and will likely impose more pressures on waste management.[3] The cost of managing this waste is of constant concern to foodservice operators. The average gate fee at landfills has increased 43% from 1993 to 2008.[4,5] Other variables that must be considered in the disposal of waste are labor, storage locations and containers, supplies such as bags, equipment rental, haul charges, and food safety.[7] Food waste processed by a garbage disposal requires the use of water and energy. Composting requires the use of vehicles, farm equipment, land, and labor.[8,9]

Despite the compelling environmental and economic arguments, dining facilities may still be skeptical about making changes to improve their sustainability. Foodservice operations are businesses relying on a positive economic status;

therefore, cost-effective alternatives and strategies must serve as a baseline for changes considered.[7,10,11] Despite efforts to improve waste management practices, the truth is that they require the use of further resources. Whereas many food waste management options exist, their cost is a prevalent factor to managers. Focus placed on preventing the amount of food disposed of may be a more economical option.

Education programs can help consumers change their food waste behaviors and are known to be an effective means in preventing food loss.[12] Messaging campaigns that educate individuals about the positive effects of their own actions may potentially improve their behavior. Providing this information allows consumers to be aware of the connection between their actions and the environmental consequences of these behaviors. Proenvironment behavior has been shown to be influenced by beliefs about what is affected by various environmental conditions and that individual actions can assist in alleviating these problems.[13,14] Messaging and feedback campaigns have positively influenced the sustainability-related behaviors of individuals.[15]

The first objective of our study was to evaluate the beliefs of university students participating in an on-campus meal plan regarding sustainability and food waste. The second objective was to analyze the food waste behaviors of these university students. The final objective was to explore whether simple prompt-type poster messages would lead to improved beliefs and a reduction in edible waste or if more feedback-based postings were necessary.

The Elaboration Likelihood Model of Persuasion provided the theoretical framework for this study. The Elaboration Likelihood Model supports that there are two routes to persuasion. These routes are based on the presence or absence of elaboration or thinking about the ideas presented.[16] The peripheral route can happen quite quickly without the need for logic or genuine thought, such as a glancing at a simple prompt-type poster. The central route involves more thought and consideration of personal influence, such as evaluation of feedback data. Both routes can be beneficial and both can lead to change.[16] Knowing the type of information needed to simply make an individual aware of food waste in an effort to decrease edible waste can benefit managers aiming to improve sustainability in their operations.

METHODS

Setting and Participants

The population for this operational study was approximately 540 students who lived in three residence halls and purchased meal plans during the spring semester of 2011. The sample included students who ate meals in-house during the data collection period.

The setting of this study was an all-you-care-to-eat dining facility at a university in the Midwest. Only residents from three specific residence halls and up to 15 student guests per meal were allowed to dine in the facility. This setting allowed student behavior to be easily monitored. Breakfast, lunch, and dinner were served Monday through Friday. This facility did not operate on weekends or holidays.

Instrument Development

A questionnaire was developed to explore the constructs of this study and was based on a review of the pertinent literature. The instrument assessed students' beliefs concerning food waste and sustainability, and gathered basic demographic data. The instrument was reviewed by Department of Hospitality Management and Dietetics faculty, pilot-tested with 65 university students, and modified according to feedback. These steps ensured that the survey had adequate content validity.

The final version of the written instrument was constructed of eight questions measuring students' beliefs. Two questions focused on evaluating the participants' beliefs regarding sustainability and self. Six questions were directed at measuring beliefs toward food waste. Students were asked to rate their opinion on each of these items on a one to five scale (strongly disagree to strongly agree). The final section contained five questions to obtain demographic data about the students, including sex, class standing, academic college in which they were enrolled, location of their home town, and urban vs rural status of their home town. The survey was administered at three time points during the 6-week research period. All students who participated were entered into various drawings for gift certificates.

Food Waste Data Collection

Edible food waste data were collected by monitoring every tray for lunch and dinner service during the 6-week research period. Beverages in glasses and nonedible items such as fruit peels, bones, and paper items were not monitored for this study. A sanitation supervisor and a group of student research assistants were trained on the food waste monitoring and recording process to ensure accurate measures. The process of weighing waste was implemented 3 weeks before the beginning of data collection to allow for adaptation to the routine.

All students returning their trays to the dishroom carousel during the 6-week study, regardless of whether they had completed a survey, were asked to participate in a tray tracking program. If they were willing, their tray was coded with a number. The student then signed their student identification number onto a form containing the same code number. As the coded trays entered the dishroom, all edible food items were scraped into a container on a digital scale. The weight of this individual waste was recorded in grams on a form containing the tray number codes. This code was used to match participant survey responses with individual tray waste data.

All edible food on uncoded trays was scraped into a separate container, and weighed at the end of each meal. This allowed the researchers to calculate the total amount of edible food waste disposed of by all students dining in this facility, in addition to the individual tray data being collected.

Experiment Design

The experiment began with a 2-week baseline period (Time 1). During this baseline period, food waste was documented and the baseline premessage questionnaire was administered. During the third week of the study, a prompt-type intervention was initiated and food waste data continued to be documented (Time 2). The second intervention occurred during Week 5 and employed a feedback-based message and food waste data collection (Time 3). During the final week all intervention messages were removed but weighing of the waste continued.