

# **Dietitians' Requirements and Self-evaluation of Knowledge and Attitude for Educational Program Development of Sustainability Management at School Foodservice**

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## **Abstract**

*The study aimed to identify dietitians' requirements and self-evaluation of knowledge and attitude levels for sustainability management at school food service and compare the knowledge and attitude by general characteristics. Excluding responses with missing data, 187 responses were used for data analysis. The respondents were 38.5% in their 30s, 47.1% with 6 to 10 years of experience, and 39.6% in elementary schools. In terms of knowledge, the 'facility and energy management (4.24)' category received the highest perceived need score, followed by 'procurement (4.07)' and 'waste management (4.04)'. The knowledge category that received the highest self-evaluation was 'procurement (3.59)', while the category that received the lowest was 'nutrition education (3.04)'. In terms of attitude, the highest perceived need was associated with 'procurement (4.21)', followed by 'facility and energy management (4.14)' and 'waste management (4.08)'. The attitude category that received the highest self-evaluation was 'facility and energy management (3.88)', while the category that received the lowest was 'nutrition education (3.15)'. The dietitians' requirements of knowledge and attitude scores were significantly higher than their self-evaluated knowledge and attitude scores in all job functional areas ( $p < 0.001$ ). In most areas, the needs and self-evaluation showed significant differences in career, type of contract, and working school level. In all functional areas, dietitians' knowledge and attitude scores in elementary school were the highest ( $p < 0.001$ ).*

**Keywords:** *Sustainability, Management, School, Foodservice, Dietitian, Knowledge, Attitude*

## **1. Introduction**

Our society faces a severe crisis due to environmental issues such as fine dust, climate change, and water shortage. These issues are not limited to mere ecological pollution problems but are becoming social problems and causing significant social and economic costs [1]. As social values become increasingly important, neglecting to address environmental pollution and social issues can lower the societal reputation of a company, which in turn can decrease long-term competitiveness [2][3][4]. Therefore, corporate social responsibility has become a survival strategy under the new

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management environment where companies are pursuing sustainability management that comprehensively considers environmental soundness and social responsibility.

In the food service industry, various efforts are also being made to implement sustainability management. For example, in the United States, the Green Seal and the Green Restaurant Association have provided evaluation criteria for restaurant sustainability management [5][6]. However, in the case of school meals, while studies on eco-friendly ingredients, as well as the recognition of and satisfaction among dietitians, have been performed [7][8][9][10], research on sustainability management based on job categories of dietitians has rarely been conducted [4][11]. Therefore, the purpose of this study is to compare the requirements and self-evaluation of school-based dietitians' knowledge and attitude toward sustainability management and to utilize the results as primary data for developing an educational program regarding sustainability management.

## **2. Methodology**

### **2.1. Sample and data collection**

The questionnaires were administered to Korean dietitians for the requirement and self-evaluation of knowledge and attitude for sustainability management. The survey was conducted via email and direct visits from June 1 to June 30, 2016. Two hundred twenty copies were distributed, and 195 copies were retrieved (recovery rate: 88.6%). Of these, 187 copies were used for data analysis, excluding incomplete questionnaires.

### **2.2. Survey**

The knowledge and attitudes required by dietitians for sustainability management were developed by referring to existing literature [5][6][12][13][14]. The task areas categorizing knowledge and attitudes of dietitians were menu management, procurement, food production, facility and energy management, waste management, nutrition education, and personnel management. The knowledge and attitude requirements and the self-evaluation items were examined on a 5-point scale (1-point: not at all, 5-points: very much).

### **2.3. Data analysis**

The collected data were analyzed using SPSS 24.0. Mean and standard deviation were performed for requirements and self-evaluation regarding knowledge and attitude. For each task, Cronbach's alpha coefficients on knowledge and attitude items were calculated to ensure internal consistency. A paired t-test was conducted to identify the difference between self-evaluation and the requirements for knowledge and attitudes of dietitians by task.

## **3. Results**

### **3.1. Profile of respondents**

All respondents were female, 36.4% (68 individuals) were in their 20s, 38.5% (72 individuals) were in their 30s, and 18.7% (35 individuals) were in their 40s Table 1. Among these, 72.2% (135 individuals) graduated from a 4-year university program,

47.1% (88 individuals) had worked in a company for 6-10 years, and 59.4% (111 individuals) held permanent positions. Furthermore, 39.6% (74 individuals) were in elementary school, 33.7% (63 individuals) were in middle school, 26.7% (50 individuals) were in high school, and 79.1% (148 individuals) worked in the city.

### 3.2. Requirements and self-evaluation of dietitian’s knowledge for sustainability management

Cronbach’s alpha was calculated as 0.65 to 0.83 to evaluate the dietitians’ knowledge in the seven task areas, and internal consistency was secured in [Table 1]. As a result of examining the degree of expertise required to practice sustainability management, it showed a distribution of 3.47 to 4.66 points. The knowledge requirement score for each task was in the order of facility and energy management (4.23), procurement (4.07), waste management (4.04), food production (3.98), menu management (3.96), personnel management (3.48), and nutrition education (3.36). Self-evaluation of knowledge for practicing sustainability management showed a distribution of 2.71 to 3.96 points; thus, all items were surveyed with less than 4 points. Knowledge self-assessment scores by task were in the order of procurement (3.59), facility and energy management (3.48), waste management (3.36), food production (3.34), personnel management (3.29), menu management (3.25), and nutrition education (3.04). Comparing the dietitians’ requirement of knowledge and self-evaluation by task indicated that requirement scores were significantly higher than the self-evaluation scores in all 25 items ( $p < 0.001$ ).

Table 1. Requirements and self-evaluation of dietitian’ knowledge for sustainability management

	Knowledge statement	Requirement	Self-evaluation	t-value
Menu management (0.70)	Knows principles for healthy menu planning <sup>1)</sup> .	4.15 <sup>2)</sup> ±0.61	3.39±0.62	72.767***
	Knows menus using eco-friendly ingredients (organic, pesticide-free, no antibiotics).	4.14±0.50	3.43±0.50	111.220***
	Knows development processes of standardized recipes.	3.53±0.62	2.71±0.62	327.534***
	Knows about the critical relationship between activities for sustainability management and students’ long-term health.	4.00±0.56	3.46±0.74	76.207***
	Mean	3.96±0.50	3.25±0.45	208.377***
Procurement (0.68)	Knows eco-friendly certification standards and labeling systems.	4.66±0.47	3.96±0.50	66.829***
	Knows proper order procedures for standardized recipes.	3.87±0.62	3.31±0.61	86.411***
	Knows purchasing procedures and storage principles that prevent food loss.	3.94±0.78	3.50±0.77	62.607***
	Mean	4.07±0.49	3.59±0.52	115.688***
Food production (0.83)	Knows procedures for production management of standardized recipes.	3.73±0.57	3.11±0.57	96.668***
	Knows energy conservation methods in pre-processing and cooking processes.	4.28±0.68	3.72±0.68	59.997***
	Knows water-saving methods in pre-processing and cooking processes.	3.91±0.68	3.48±0.68	102.211***
	Knows proper handling procedures of ingredients, including the disposal of discarded portions and the washing of pre-processed ingredients.	3.83±0.78	3.36±0.78	62.726***

	Knows proper computation methods for total production amounts and the menu's production methods.	4.10±0.76	3.05±0.69	293.915 <sup>***</sup>
	Mean	3.98±0.52	3.34±0.67	180.635 <sup>***</sup>
Facility and energy management (0.81)	Knows energy (electricity, gas, etc.) conservation methods.	4.32±0.58	3.50±0.58	129.278 <sup>***</sup>
	Knows water-saving methods.	4.22±0.67	3.49±0.67	147.140 <sup>***</sup>
	Knows procurement methods for energy-efficient equipment and appliances (refrigerator, heating cabinet, lights).	4.14±0.62	3.38±0.61	95.738 <sup>***</sup>
	Knows standard routine inspection and repair methods of kitchen appliances.	4.24±0.71	3.55±0.71	152.957 <sup>***</sup>
	Mean	4.23±0.58	3.48±0.63	236.326 <sup>***</sup>
Waste management (0.65)	Knows methods of recycling food waste.	3.74±0.58	3.06±0.58	134.143 <sup>***</sup>
	Knows methods of minimizing waste.	4.21±0.76	3.59±0.76	83.069 <sup>***</sup>
	Knows methods of minimizing food waste.	4.18±0.60	3.44±0.57	85.416 <sup>***</sup>
	Mean	4.04±0.53	3.36±0.49	159.426 <sup>***</sup>
Nutrition education (0.69)	Knows how to educate students on sustainability management.	3.97±0.84	3.22±0.84	203.611 <sup>***</sup>
	Knows how to use meal services for education for sustainability management	3.47±0.80	2.80±0.63	125.015 <sup>***</sup>
	Knows how to guide students on reducing leftover food.	3.94±0.57	3.11±0.57	293.928 <sup>***</sup>
	Mean	3.79±0.54	3.04±0.54	351.782 <sup>***</sup>
Personnel management (0.66)	Knows how to educate cooks on sustainability management.	3.83±0.74	3.28±0.75	59.713 <sup>***</sup>
	Knows how to educate cooks on the conservation of energy and water.	3.88±0.84	3.37±0.56	72.745 <sup>***</sup>
	Knows how to educate cooks on minimizing waste.	3.77±0.67	3.23±0.81	52.036 <sup>***</sup>
	Mean	3.83±0.54	3.29±0.51	97.814 <sup>***</sup>

1) A 5-point Likert-type scale was used (1: strongly disagree-5: strongly agree), 2) Mean±SD, \*\*\*p<0.001

Table 2. Requirements and self-evaluation of dietitian' attitude for sustainability management

Area	Attitude statement	Requirement	Self - evaluation	t-value
Menu management (0.69)	Tries to provide eco-friendly meals <sup>1)</sup> .	3.89 <sup>2)</sup> ±0.51	3.51±0.54	41.518 <sup>***</sup>
	Tries to provide healthy meals.	4.02±0.64	3.65±0.67	34.892 <sup>***</sup>
	Tries to provide meals that reflect the results of leftover food monitoring.	3.91±0.47	3.42±0.47	73.790 <sup>***</sup>
	Mean	3.93±0.43	3.53±0.44	85.695 <sup>***</sup>
Procurement (0.62)	Tries to purchase eco-friendly agro-fishery products	4.27±0.53	3.85±0.56	50.186 <sup>***</sup>
	Tries to purchase eco-friendly meat and poultry.	3.86±0.70	3.31±0.71	108.353 <sup>***</sup>
	Tries to purchase local agricultural products (regional products).	4.57±0.66	4.05±0.66	82.683 <sup>***</sup>
	Tries not to buy genetically modified agricultural products or goods.	4.16±0.66	3.52±0.66	138.238 <sup>***</sup>
	Tries to purchase in-season food ingredients.	4.18±0.63	3.91±0.62	56.048 <sup>***</sup>
	Mean	4.21±0.44	3.52±0.47	26.051 <sup>***</sup>

Food production (0.83)	Tries to conserve energy in pre-processing and cooking processes.	3.76±0.46	3.51±0.46	50.459***
	Tries to save water in pre-processing and cooking processes.	4.46±0.50	4.02±0.50	64.166***
	Tries to produce exact serving sizes through the use of standardized recipes.	3.85±0.70	3.21±0.73	292.788***
	Tries to reduce the trash in pre-processing and cooking processes.	4.02±0.74	3.51±0.74	72.011***
	Mean	4.02±0.42	3.56±0.42	136.536***
Facility and energy management (0.82)	Tries to turn off the tap when not in use.	4.53±9.50	4.20±0.51	40.173***
	Tries to routinely clean equipment and ventilator filters to conserve energy.	3.90±0.55	3.65±0.55	57.222***
	Tries to use energy-efficient equipment and appliances (refrigerator, heating cabinet, lights).	4.19±0.75	3.78±0.75	51.291***
	Mean	4.14±0.42	3.88±0.42	25.548***
Waste management (0.60)	Tries to minimize food waste.	4.07±0.77	3.69±0.76	45.932***
	Tries not to use disposables unless necessary.	4.12±0.74	3.83±0.75	45.024***
	Tries to think of and implement ways to reuse food waste.	4.06±0.59	3.61±0.60	55.020***
	Mean	4.08±0.53	3.71±0.53	79.536***
Nutrition education (0.90)	Tries to educate students on how to protect the environment.	3.84±0.74	3.21±0.74	113.862***
	Tries to educate students on a healthy dietary life related to sustainability management.	3.98±0.83	3.39±0.82	78.004***
	Tries to persuade students to participate in campaigns related to sustainability management activities.	3.59±0.72	2.85±0.72	93.943***
	Mean	3.80±0.71	3.15±0.70	153.119***
Personnel management (0.63)	Tries not to discriminate based on age, education, religion, etc., when hiring cooks.	4.15±0.71	3.69±0.71	101.072***
	Tries to have cooks participate in energy and water conservation efforts.	3.98±0.60	3.60±0.66	82.511***
	Tries to have cooks participate in food service activities related to sustainability management.	3.81±0.65	3.28±0.66	78.964***
	Mean	3.98±0.51	3.52±0.51	146.050***

<sup>1)</sup> A 5-point Likert-type scale was used (1: strongly disagree–5: strongly agree), <sup>2)</sup> Mean±SD, \*\*\*p<0.001.

### 3.3. Requirements and self-evaluation of dietitian' attitude for sustainability management

Cronbach's alpha was calculated to be 0.62 to 0.90 to evaluate dietitians' attitudes in the seven task areas, and the internal consistency was secured in [Table 3]. The survey on attitudes required by dietitians to practice sustainability management showed a distribution of 3.53 to 4.57 points. Meanwhile, the self-evaluation of the dietitians regarding attitudes toward sustainability management showed a distribution of 2.85 to 4.20 points. The scores of the attitude of each attitude by task were in the order of procurement (4.21), facility and energy management (4.14), waste management (4.08), food production (4.02), personnel management (3.98), menu management (3.93), and nutrition education (3.80). The scores of the self-evaluation on the attitude towards tasks were in the order of facility and energy management (3.88), waste management

(3.71), food production (3.56), menu management (3.53), procurement (3.52), personnel management (3.52), and nutrition education (3.15). Comparing the dietitians' requirements regarding attitudes and self-evaluation by task indicated that requirement scores were significantly higher than the self-evaluation scores in all 25 items ( $p < 0.001$ ). The results of requirements and self-evaluation regarding attitudes by task indicated that the requirements of all 25 items were significantly higher than those of their self-evaluation ( $p < 0.001$ ).

#### 4. Conclusions

To effectively implement sustainability management in school meals, knowledge of sustainability management should be provided for each task of the dietitian, and a high level of attitude among the dietitians is an essential factor. The results of this study indicate that the self-evaluation scores of dietitians were low in all items. Thus, training and education programs should be developed to improve the knowledge and attitude of dietitians regarding sustainability management. To encourage the active participation of dietitians, it is necessary to provide systematic support and education to ensure that they have a solid attitude and give knowledge on proper sustainability management.

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