DARTMOUTH

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# Dartmouth Dining
## for Vegans and Vegetarians

HOURS & LOCATIONS | MENU | MEAL PLANS | INCLUSIVE DINING | EVENTS | EMPLOYMENT | ABOUT

**Ashley Goh**
**ENGS 15.07**
**August 21, 2024**

**UXR Reviewers:**
Alden Wilcox, Lily Chabica, Faith Niyi-Awolesi, Jabari Johnson, Corey Huebner, Madison Davis, Katherine Walker

# EXECUTIVE SUMMARY

1. **Compared to top dining halls in the nation, Dartmouth Dining has a higher percentage of vegan and vegetarian options**
   The issue is not the quantity of options available; students need to be more aware that these options are available

2. **There is a curb-cut effect in place; those without dietary restrictions tend to eat vegetarian**
   Adding more vegetarian options can benefit everyone

3. **The layout of ‘53 Commons is spread out, making food options less apparent and intuitive**
   Constrained by space, providing spaces such as open office hours and a more detailed dining app may make students more aware of options available

# BACKGROUND

# PROJECT OVERVIEW

STAKEHOLDERS

WHAT

HOW

**The Director of Dining at Dartmouth, along with other managers,** are looking to **better understand students with vegan and/or vegetarian dietary needs,** including **current satisfaction with programs and options offered at ‘53 Commons and general feedback about offerings at other Dining venues.**

# NOTES FROM STAKEHOLDER INTERVIEW

1. Vegan and vegetarian students send comments about not liking the options
2. A lot of students get into habits and don’t venture out; they don’t know what’s there
3. Looking for what students like and want to see more of

# PROBLEM STATEMENT

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Despite existing efforts to provide diverse and nutritious options, feedback indicates dissatisfaction among vegan and vegetarian students regarding the variety and availability of suitable meals at ‘53 Commons and other dining venues. The goal of this project is to ensure equity between Dartmouth students that are vegans/vegetarians and those with no dietary restrictions to maximize satisfaction from Dartmouth Dining locations.

## NOTES FROM STAKEHOLDER INTERVIEW

1. Vegan and vegetarian students send comments about not liking the options
2. A lot of students get into habits and don’t venture out; they don’t know what’s there
3. Looking for what students like and want to see more of

# STUDY PLAN

# RESEARCH QUESTIONS

1. How does meal satisfaction differ between those with vegan, vegetarian, and no dietary restrictions?
2. How does satisfaction vary by meal type (breakfast, lunch, dinner, late-night) among participants with different dietary restrictions?
3. How aware are vegan and vegetarian students of the available meal options and nutritional information provided by Dartmouth Dining?

# RESEARCH METHODS

## DESK RESEARCH

### Competitive Analysis

WITH ALDEN

## PRIMARY RESEARCH

### Population Survey

WITH ALDEN

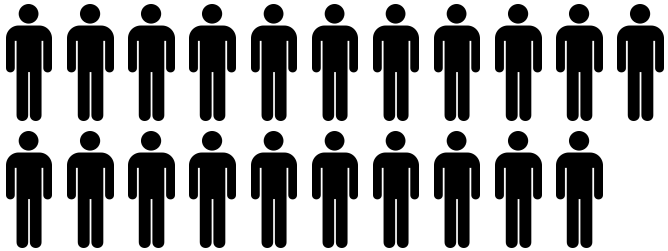
### Diary Study

# COMPETITIVE ANALYSIS GOAL

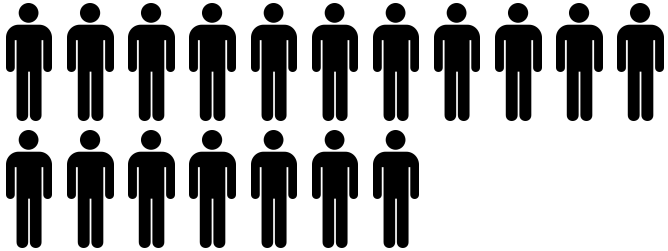
**Known for great dining**

**Small Liberal Arts College in New England**

# POPULATION SURVEY

21 responses total



18 vegan/vegetarians

# POPULATION SURVEY RELEVANT QUESTIONS

1. **Are you vegan/vegetarian?**
   Verify that the participant is vegan/vegetarian
2. **How satisfied are you with the vegan/vegetarian options at Dartmouth Dining?**
3. **Rate the variety of vegan/vegetarian options available at Dartmouth Dining locations.**
4. **Any further comments?**

# DIARY STUDY

**14 participants**
**(5 vegans, 5 vegetarians, 4 no dietary restrictions)**

**Every meal** Breakfast, Lunch, Dinner

**5 days**

**Other** Daily reminders, Anonymous

# BIAS CHECK

## Social desirability bias

Three participants were my roommates (one vegan, one vegetarian, one gluten-free)

# DIARY STUDY QUESTIONS

1. **Are you vegan or vegetarian?**
   Keep track of participants while keeping it anonymous
2. **What are you currently craving?**
   Like “did you find everything you were looking for?” when checking out
3. **What did you eat?**
4. **What did you drink?**
5. **Rate your satisfaction from this meal.**
6. **Any comments?**

# DIARY STUDY RESPONSES


**68%**

**14 participants x**
**5 days x**
**3 meals / day =**
**210 responses**

# HOW DO THESE RESEARCH METHODS ANSWER MY RESEARCH QUESTIONS?

# RESEARCH QUESTIONS

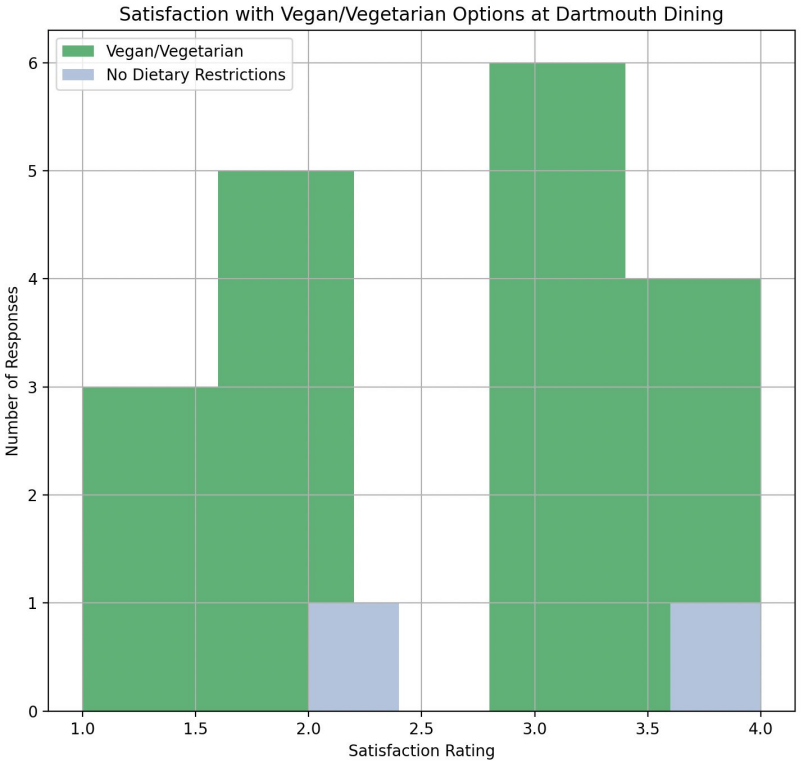
1. **How does meal satisfaction differ between those with vegan, vegetarian, and no dietary restrictions?**

2. How does satisfaction vary by meal type (breakfast, lunch, dinner, late-night) among participants with different dietary restrictions?

3. How aware are vegan and vegetarian students of the available meal options and nutritional information provided by Dartmouth Dining?

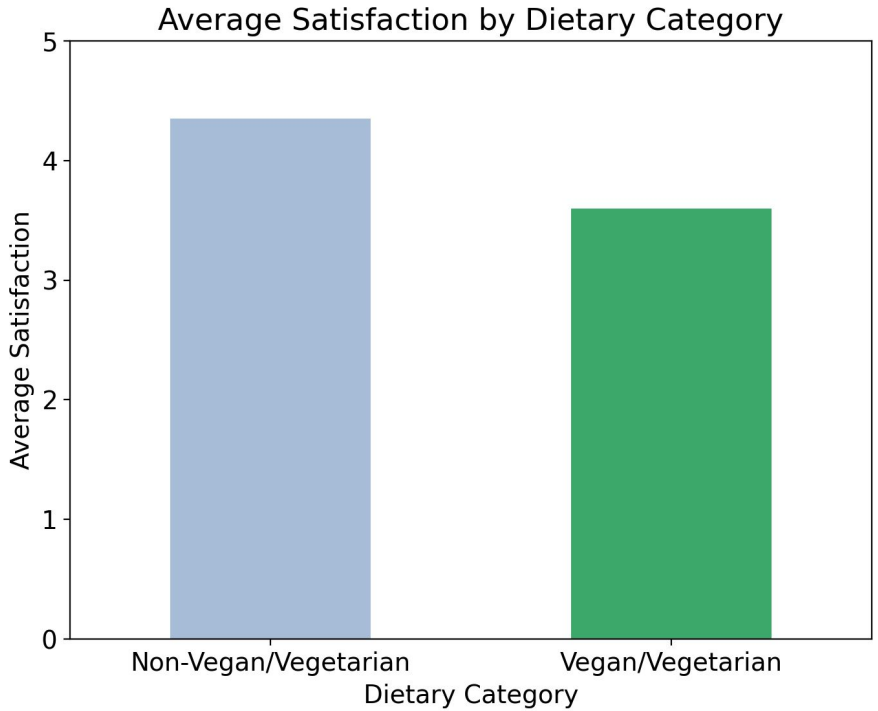
# POPULATION SURVEY RESULTS

## How satisfied are you with the vegan/vegetarian options?



# DIARY STUDY RESULTS

## Rate your satisfaction from this meal
## (1 - not satisfied to 5 - very satisfied)



# POPULATION SURVEY SENTIMENT ANALYSIS USING BERT

## Any further comments about Dartmouth Dining?

2 positive

0 neutral

6 negative

# RESEARCH QUESTIONS

1. How does meal satisfaction differ between those with vegan, vegetarian, and no dietary restrictions?

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# DIARY STUDY RESULTS

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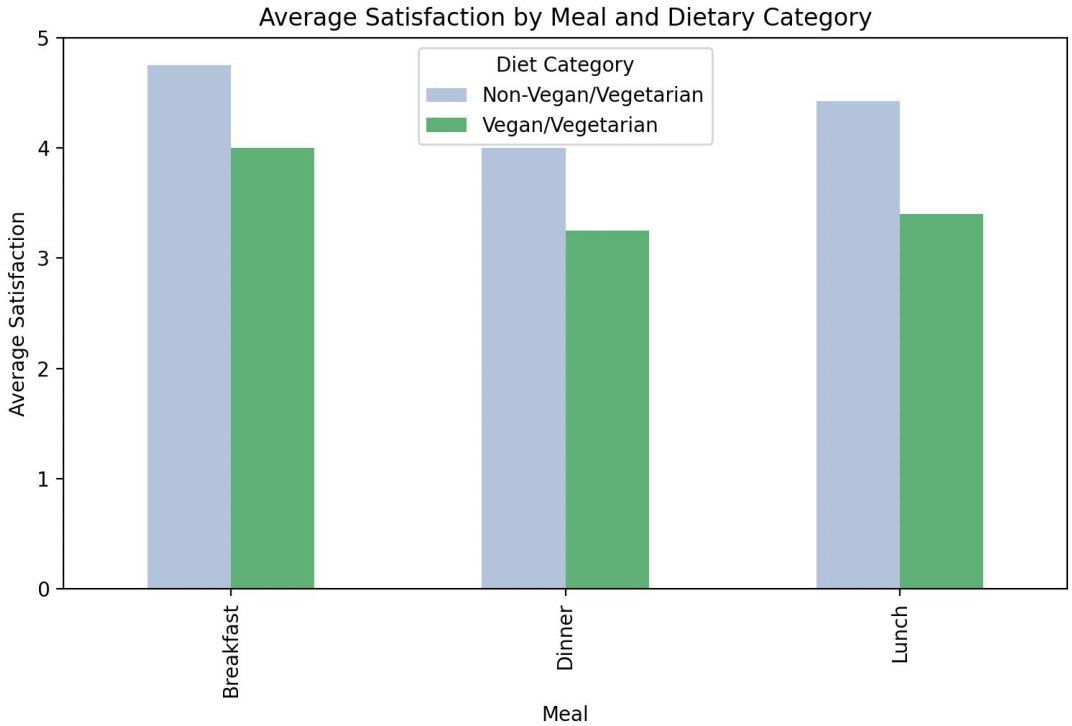

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3. **How aware are vegan and vegetarian students of the available meal options and nutritional information provided by Dartmouth Dining?**

# COMPETITIVE ANALYSIS

| | DARTMOUTH | Ucla | University of Massachusetts Amherst |
|---|---|---|---|
| **# of undergraduate students** | 4,458 | 32,423 | 22,854 |
| **% of vegetarian dishes available for dinner** | 75.37% | 69% | 25% |
| **% of vegan dishes available for dinner** | 54.20% | 42.31% | 13.46% |

SEVERITY

# INSIGHT #1

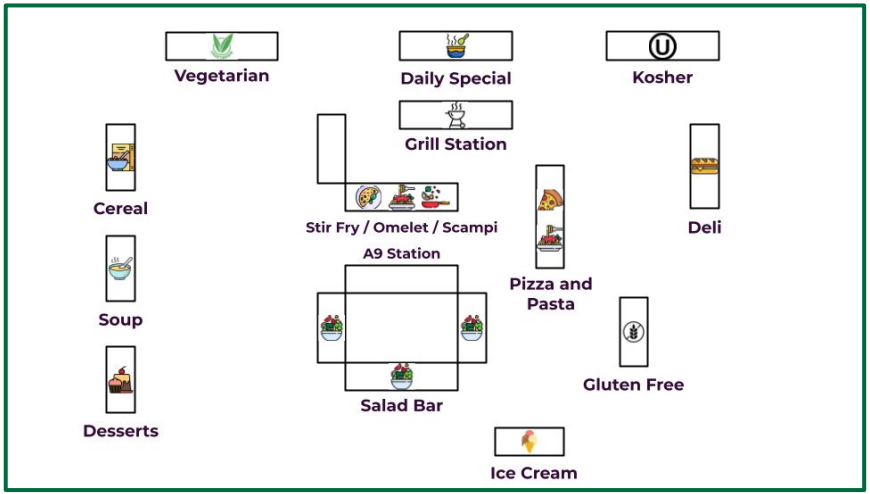
**As compared to two of the top dining halls in the nation, Dartmouth Dining has a higher percentage of vegan and vegetarian options**

# BIAS CHECK

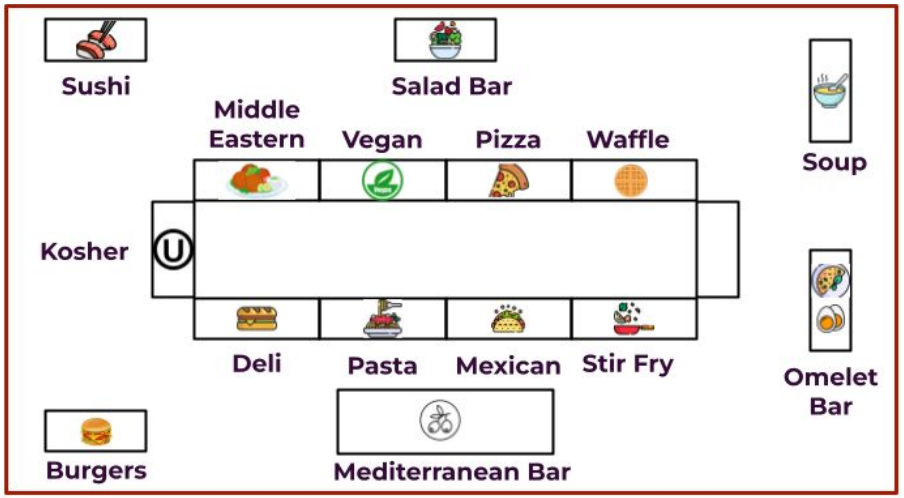
This data is based off of the **summer dining menu,** which may vary during the school year

# COMPETITIVE ANALYSIS: DINING LAYOUT

## Dartmouth vs UMass Amherst




## ‘53 Commons




## Franklin Commons

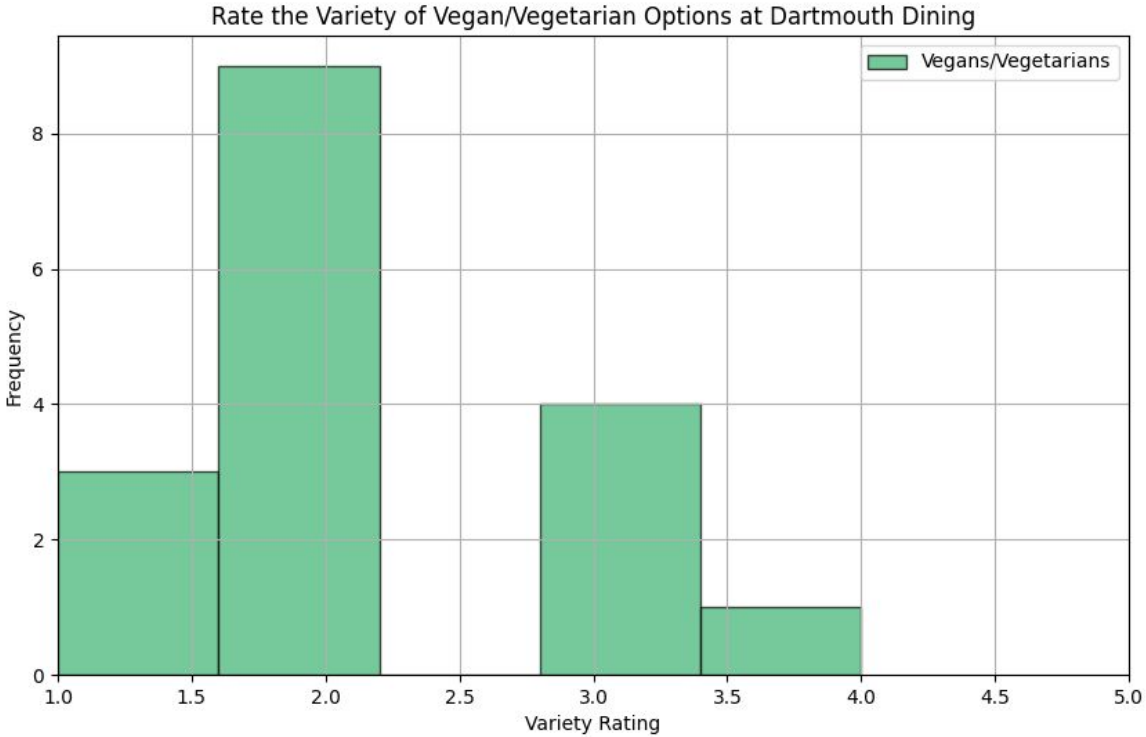
SEVERITY

# INSIGHT #2

## The layout of ‘53 Commons is spread out, making food options less apparent and not intuitive

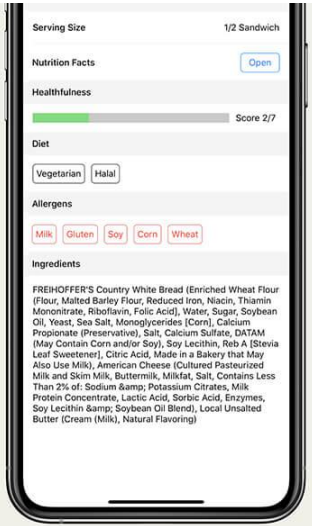
# POPULATION SURVEY RESULTS

## Rate the variety of vegan/vegetarian options at Dartmouth Dining (1 - no variety to 5 - lots of variety)



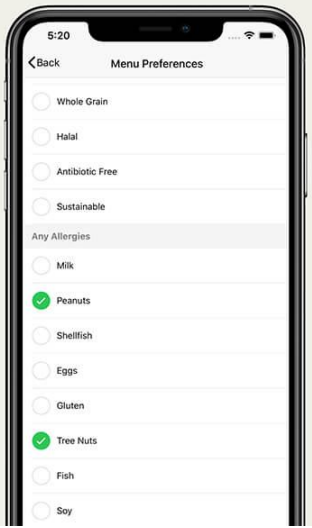
# UMASS DINING APP

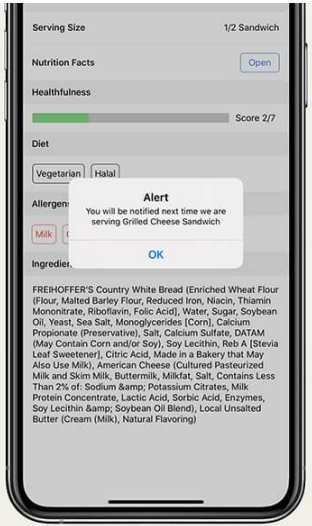
See what's open!


Nutritional info at your fingertips!

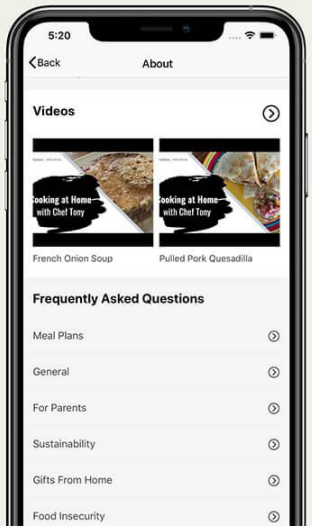
Customize your searches!



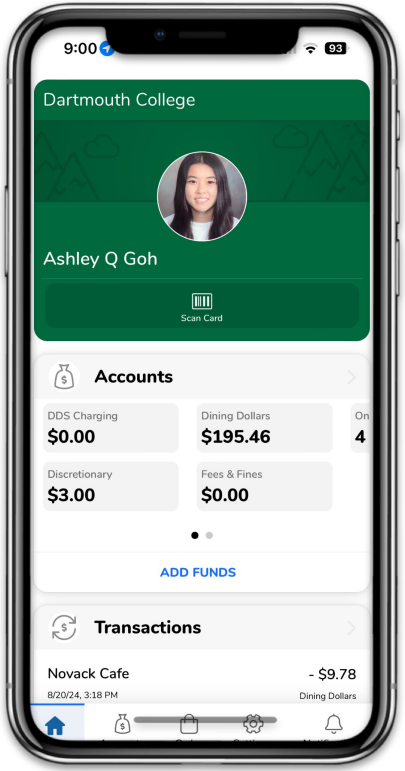



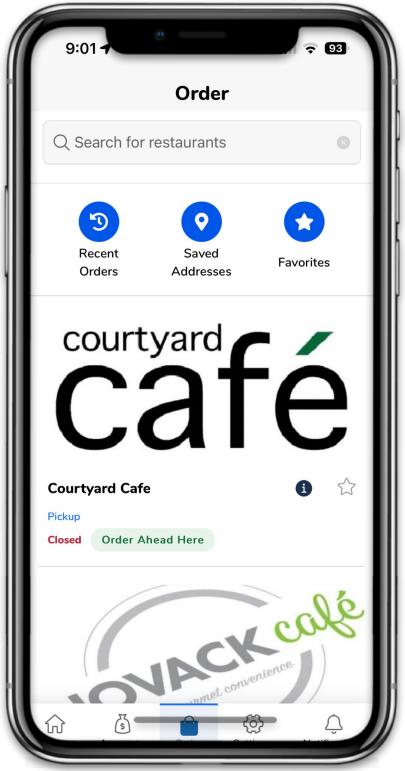

Get alerts for your favorite meals!

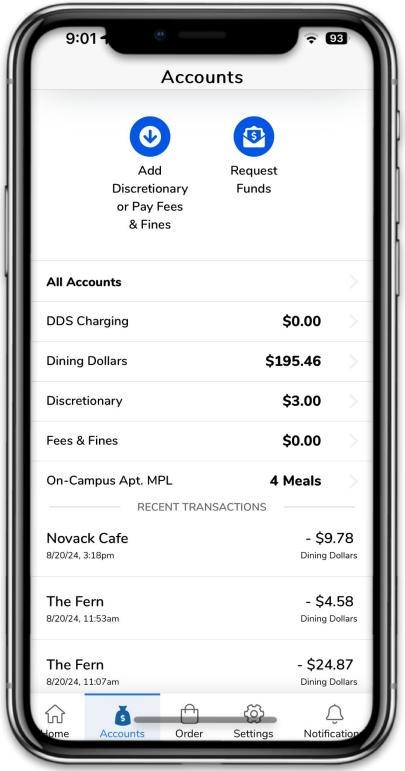
Access video recipes & FAQ!



# GET MOBILE APP



University of Massachusetts Amherst

DARTMOUTH

- Real-time traffic reports for each dining location
- Plan your menu - choose dietary preferences and allergens
- **If there is something you don't see, contact them, and they can tell you where to find it**

- Order on the app
- See your balance
- See recent transactions
- Add money to your account

ACTIONABILITY

# RECOMMENDATION

Though Dartmouth Dining has many options for vegans and vegetarians, there is a need to make students aware of where they can be found, such as a dining app

# UCLA DIETITIAN OPEN OFFICE HOURS

UCLA

Housing

Students | Faculty | Summer | Dining | Student Technology Center (STC)

Home

## Ask the Dietitian

### Dining

- Menus
- Dining Locations
- Hours of Operation
- Services & Programs
- Nutrition Education
- Food Allergies
- Ask the Dietitian

*To ensure that our on-campus residents have uninterrupted access to vital diet and nutrition information, Carole Bartolotto, Registered Dietitian (RD), is available for consultation on the following days and times:*

*Monday 3pm-6pm*
Thursday 11am-1pm
Friday 4pm-6pm

*Contact her via e-mail at AsktheRD@ha.ucla.edu to arrange an appointment.*

### About the Dietitian

Carole Bartolotto is a Registered Dietitian with a lot of passion for food and nutrition. She was a Senior Consultant at Kaiser Permanente where she oversaw the development of publications and educational materials and managed health education programs and projects related to health, diet, and cardiovascular disease. She has published articles on the plant-based diet and sugar and artificial

ACTIONABILITY

# RECOMMENDATION

**By offering open office hours for students to ask nutrition/diet-related questions, Dartmouth Dining can better address students' specific dietary concerns or special needs**

# Term Frequency - Inverse Document Frequency (TF-IDF) Results:

**What are you currently craving?**
bell, completely, satiated, sleep, taco

**What did you eat?**
chicken, **pasta, tofu,** sandwich, foco

**What did you drink?**
water, iced, coffee, matcha, latte

**Any comments?**
24, sick, slayed, station, stir

# One-Sample Proportion Z-Test

## Hypotheses:

**$H_0$:** The proportion of vegetarian meals among students without dietary restrictions is less than or equal to 30%

**$H_A$: The proportion of vegetarian meals among students without dietary restrictions is greater than 30%**

## Results:

**p-value: 0.0157**; $p < 0.05$, so we **reject the null hypothesis**

The proportion of vegetarian meals among students without dietary restrictions is **statistically significant**

# One-Sample Proportion Z-Test Validity

- ✓ Random sampling
- ✓ Independence
- ✓ Sample size
- ✓ Mutually exclusive

SEVERITY

# INSIGHT #3

## There is a curb-cut effect in place; those without dietary restrictions tend to eat vegetarian

# BIAS CHECK

**This data is based off of ‘26s on campus this summer and Beth’s estimation of 30% of Dartmouth students being vegan/vegetarian**

# APPENDIX

## Resources

**Study Plan →**

**Competitive Analysis →**

**TF-IDF Code →**

**One-Sample Proportion Z-Test →**

**Sentiment Analysis Code →**


## Acknowledgements

**UXR Reviewers:**

Alden Wilcox
Professor Mike D'Andrea
Lily Chabica
Faith Niyi-Awolesi
Jabari Johnson
Corey Huebner
Madison Davis
Katherine Walker

# TF-IDF Code and Output

```python
import pandas as pd
from sklearn.feature_extraction.text import TfidfVectorizer

# Load the data from the Excel file
file_path = 'diarystudy.xlsx'
diary_study_data = pd.read_excel(file_path)

# Function to apply TF-IDF to a specific column and return the top terms
def apply_tfidf(column_data, top_n=5):
    # Convert column data to a list of strings
    text_data = column_data.dropna().astype(str).tolist()

    # Apply TF-IDF
    vectorizer = TfidfVectorizer(stop_words='english', max_features=top_n)
    tfidf_matrix = vectorizer.fit_transform(text_data)

    # Get the top terms with the highest TF-IDF scores
    feature_names = vectorizer.get_feature_names_out()
    sorted_items = sorted(zip(vectorizer.idf_, feature_names))

    return [item[1] for item in sorted_items]

# Apply TF-IDF to each text-based column
tfidf_results = {}
text_columns = ["What are you currently craving?", "What meal did you just have?",
                "What did you eat?", "What did you drink?", "Any comments?"]

for column in text_columns:
    tfidf_results[column] = apply_tfidf(diary_study_data[column])

# Display the top terms for each column
print(tfidf_results)
```

```
(base) ashleygoh@Ashleys-MacBook-Pro engs15 % python3 testing.py
{'What are you currently craving?': ['bell', 'completely', 'satia
ted', 'sleep', 'taco'], 'What meal did you just have?': ['lunch',
 'dinner', 'breakfast'], 'What did you eat?': ['chicken', 'pasta'
, 'tofu', 'sandwich', 'foco'], 'What did you drink?': ['water', '
iced', 'coffee', 'matcha', 'latte'], 'Any comments?': ['24', 'sic
k', 'slayed', 'station', 'stir']}
```

# One-Sample Proportion Z-Test

## Assumptions:

✓ **Random sampling**
✓ **Independence**
✓ **Sample size**

Expected number of vegetarian meals (successes) under the null hypothesis: 5.1

Expected number of non-vegetarian meals (failures) under the null hypothesis: 11.9

Both expected counts > 5, which satisfies the sample size condition for the z-test, so the z-test assumptions are met for my dataset, and the result of the test can be considered valid

## Hypotheses:

**$H_0$:** The proportion of vegetarian meals among students without dietary restrictions is less than or equal to 30%

**$H_A$:** The proportion of vegetarian meals among students without dietary restrictions is greater than 30%

## Results:

**p-value: 0.0157**

$p < 0.05$, so we **reject the null hypothesis**

The proportion of vegetarian meals among students without dietary restrictions is statistically significant

# Sentiment Analysis using BERT

## Code:

```python
import pandas as pd
from transformers import pipeline

# Set device to 0 to use the first GPU, or -1 to use the CPU
sentiment_analyzer = pipeline('sentiment-analysis', device=0)  # Use GPU if available



# Load the spreadsheet
file_path = 'survey.xlsx'
data = pd.read_excel(file_path)

# Extract the relevant column for vegan/vegetarian comments
vegan_comments_column = 'Any further comments about Dartmouth Dining?'
vegan_comments = data[vegan_comments_column].dropna()

# Apply BERT-based sentiment analysis to the comments
vegan_comments_sentiment = vegan_comments.apply(lambda x: sentiment_analyzer(x)[0]['label'])

# Combine the comments with their sentiment labels
vegan_sentiment_analysis_results = pd.DataFrame({
    'Comment': vegan_comments,
    'Sentiment': vegan_comments_sentiment
})

# Summarize the sentiment categories
vegan_sentiment_summary = vegan_sentiment_analysis_results['Sentiment'].value_counts()

# Display the summary
print(vegan_sentiment_summary)
```

## Output:

```
(.venv) (base) ashleygoh@Ashleys-MacBook-Pro engs15 % python3 sentimentanalysis.py
No model was supplied, defaulted to distilbert/distilbert-base-uncased-finetuned-sst-2-english and revision af0f99b (https://huggingface.co/distilbert/distilbert-base-uncased-finetuned-sst-2-english).
Using a pipeline without specifying a model name and revision in production is not recommended.
/Users/ashleygoh/engs15/.venv/lib/python3.11/site-packages/transformers/tokenization_utils_base.py:1601: FutureWarning: `clean_up_tokenization_spaces` was not set. It will be set to `True` by default. This behavior will be depracted in transformers v4.45, and will be then set to `False` by default. For more details check this issue: https://github.com/huggingface/transformers/issues/31884
  warnings.warn(
Sentiment
NEGATIVE    6
POSITIVE    2
Name: count, dtype: int64
```