

# NutriQuest: Developing a Game- Based Experience Educating Healthy Eating Habits

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## Introduction

- Healthy eating habits could be neglected by students while they progress to college.
- College students may be deficient in self-reliance capabilities and lack understanding of dietary recommendations (Matthews et al., 2016).
- The occurrence of eating disorders has increased since 2000 and 2018, doubling from 3.4% to 7.8% of the population (Galmiche, 2019).
- As of 2020, around 28.8 million of the population is susceptible to developing an eating disorder, endangering their mental and physical well-being (Deloitte Access Economics, 2020).
- It is crucial to adopt adequate knowledge of healthy eating habits as a preventive measure.
- Intuitive eating shows a positive correlation with psychological factors, including positive body image, self-esteem, and overall well-being (Linardon et al., 2021).
- Mindful eating was observed to influence eating behaviors through promoting a preference for healthier foods based on attitudinal choices (Jordan et al., 2014).
- As an intervention measure, this research incorporates intuitive eating and mindful eating knowledge into a game-based learning experience for college students.

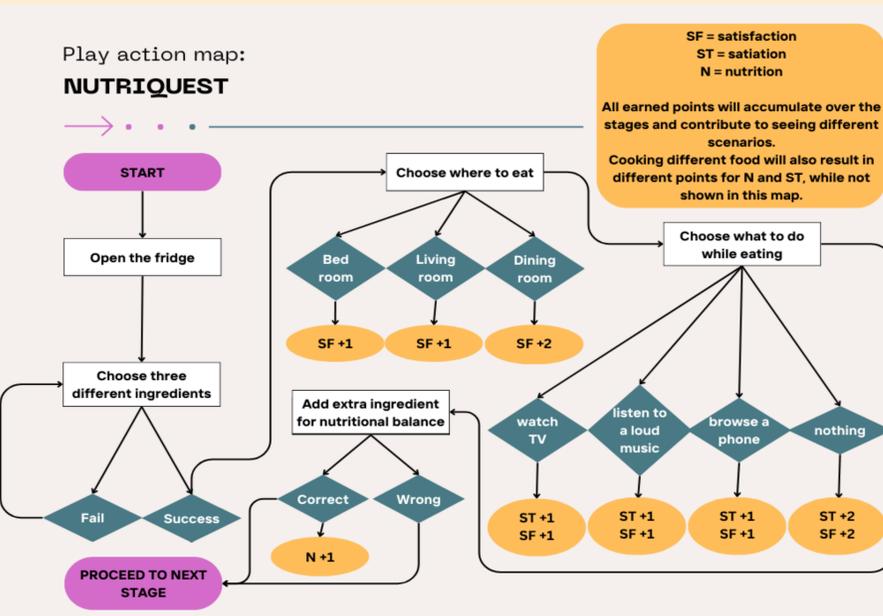


Figure 1. Play Action Map of NutriQuest



Figure 2. NutriQuest Scene- Game Start



Figure 3. NutriQuest Scene- Game End



Figure 4. NutriQuest Scene- Cooking Success



Figure 5. NutriQuest Scene- Ingredient Addition



Figure 6. NutriQuest Scene- Cook Book Opened



Figure 7. NutriQuest Scene- Activity Selection

## Method

### Game Overview

- NutriQuest was first developed in Python using Pygame
- In the second iteration of the designing process, the game was migrated to Unity, allowing for more functionality and flexibility
- NutriQuest contains 12 stages, and in each stage, the player is asked to choose three ingredients to make a balanced meal for themselves.
- Then the player is asked to choose the location and activity they intend to engage in while eating.
- During each selection process, a scoring system and educational notes are added to better guide the user to practice intuitive and mindful eating skills.

### Participants

- In 2024, this study recruited approximately 30 participants.
- Based on the G\*Power analysis (Faul et al., 2009), for a planned paired t-test aimed at detecting a medium effect size (.25) with a conventional alpha level of .05, it is necessary to enroll 27 participants to reach a power estimate of .80.
- The observation data is collected with mixed methods
  - Quantified based on an adaption of the player experience (PX) framework (Sanchez et al., 2012)
  - Observation notes taken by the researcher.
- Intuitive eating scale (Tylka & Kroon Van Diest, 2013) and mindful eating scale (Hulburt-Williams et al., 2014) were adapted for the pre- and post-test.
- The observation notes were qualitatively analyzed through thematic coding.
- The second round of iteration of user testing is scheduled for Summer 2025.
  - Potential implementation of eye-tracking devices on the users, allowing:
    - Collection of gaze patterns data
    - Collection of focus duration data.

### Acknowledgement

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## Results

- After the first round of user testing,
  - Participants strongly agreed that the gameplay simulates their everyday cooking experience.
  - Participants also generally agreed that they were able to reflect on their eating behaviors and cooking choices.
  - However, in this round, there is a minimal difference in the paired t-tests on both mindful and intuitive eating skills before and after the gameplay.
  - The average playability score is at 1.97/3.0, with the intrinsic playability value at 2.33 and the artistic playability value at 2.30.
- During the second round of user testing, we anticipate:
  - A greater difference in the paired t-tests measuring mindful and intuitive eating before and after gameplay.
  - An increase in gameplay engagement because we have added more functionalities and enhanced the user experience in this round of iteration.

## Future Development

- Design and develop a mobile version of the game along with notetaking functionality
- Develop additional functions such as user profiles with specific health or dietary concerns
- Collecting eye-tracking data to better assess the usability
- Collaborating with the health and wellness center on campus to use the game purposively as part of treatment for those with eating disorders
- Collaborating with regional healthcare providers to reach out to broader user populations
- Potential transition into the mobile gaming platform

Table 1. Descriptive Statistics on Mindful and Intuitive Eating Scales

	Pre-test		Post-test	
	Mindful Eating	Intuitive Eating	Mindful Eating	Intuitive Eating
Mean (SD)	41.57 (4.48)	2.82 (0.37)	42.54 (4.86)	2.85 (0.39)
n	28	28	28	28

Figure 8. A Radar Chart on PX Framework (IP: intrinsic playability, MP: mechanical playability, AP: artistic playability, IAP: interactive playability, IEPA: interpersonal playability, IAPA: intrapersonal playability)



## References

