MAKERERE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATION SCIENCES

SCHOOL OF COMPUTING AND INFORMATICS TECHNOLOGY

Department of Information Systems

School of Computing and Informatics Technology

BIST:(Systems Development)

TOPIC: DIET AND NUTRITION MANAGEMENT SYSTEM

A Proposal submitted to the College of Computing and Information Sciences in Partial fulfillment of the Requirements for the Award of a Degree of Bachelor of Information Systems and Technology of Makerere University.

Supervisor: Mr. Bitwire Albert George

bitwire.albert@gmail.com

+256 773-095119

Sign:..... **Date:.....**

Requirements Specification Report.

PRESENTED BY:

NAME	STUDENT NO	REG NO	E-MAIL	CONTACT
MUHUMUZA VICTOR IAN	2000703524	20/U/3524/PS	viktamuhumuza@gmail.com	0761-656330
WAKOKO SIMON PETER	2000703512	20/U/3512/PS	peterwakoko@gmail.com	0775-362626
KIKOMEKO PETER GRACE	2000703578	20/U/3578/PS	gracekikomeko@gmail.com	0775-939664
NAMBOOZE RACHAEL	2000707994	20/U/7994/EVE	racheal.nambooze@students.mak.ac.ug	0755-868603
ONEN SAM SENSY	2000703502	20/U/3502/PS	sensyonen@gmail.com	0782-150448

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1 Problem statement

1.1 Problem statement

Improper diet and nutrition are caused by inconsistent intake of healthy foods. Other causes include improper meal timings, under or overeating, not having enough healthy foods, and nutritional ignorance. Experts have revealed that only 10% of children below the age of five years are eating recommended healthy foods and this includes frequent eating nutritious meals and eating on time. This has left the majority 90% eating non-nutritious foods which has resulted in increasing numbers of childhood malnutrition and obesity (Tumwine, 2022). We, therefore, intend to contain this problem by developing a diet and nutrition management system which will guide the targeted populace categories majorly students to maintain a healthy selection of well-balanced meals daily. We aim to develop a diet and nutrition management system that will provide students with timely suggestions on the food they should consume to remain healthy.

1.2 Requirements gathering

1.2.1 Sampling Techniques

We identified cluster random sampling as our method of choice. This is so because it can be used to study large, spread-out populations with similar characteristics where aiming to interview each subject would be costly, time-consuming, and perhaps impossible.

1.2.2 Sampling Techniques

Our target population is Makerere University Students. We determined a sample size of 100 students per cluster(college) following the Multistage cluster sampling technique

under Cluster Random Sampling.

1.2.3 Data collection methods and instruments.

The process of gathering and analyzing accurate data from various sources to find answers to research problems, trends, probabilities, etc., to evaluate possible outcomes is Known as Data Collection (Simplelearn, 2023). We applied both qualitative and quantitative research methods in the collection and analysis of data. Data was collected from different individuals ie. Students, nutritionists, and Restaurant managers. Online questionnaires (Google forms), and interview guides were used as tools. This data was later used for quantitative analysis. Using descriptive statistics, on the other hand, an interview guide was carefully designed to capture views from respondents. Using cluster random sampling, 300 students were randomly selected from the colleges (CHUSS, CEDAT, and COCIS).

With the use of the cluster sampling method, we randomly identified three colleges (CHUSS, COCIS, and CEDAT) as the clusters where we sampled 100 students. Data from those students was collected using Google's online forms structured as questionnaires (including both open-ended and close-ended questions) which provided more insight into its descriptive statistics e.g. percentages, frequencies, and mean to extract the most important information about the proposed system.

Upon the strong recommendation by our supervisor, we engaged in close consultation with a Nutritionist from the Well-Care clinic headed by Dr.Paul Kasenene through periodical visits. We conducted an interview with the use of an interview guide. It included questions of types: open-ended, opinion related, and behavioral which were intended to pick his professional thoughts on the causes of improper diet and nutrition along with the probable features we could implement to help meet the objectives of the proposed

system.

Makerere students happen to dine in large numbers at the COCIS cafeteria and Africa Hall's dining area, this played a part in our decision to select the two restaurants where we interacted with the restaurant managers and used the interview approach with questions that included open-ended, opinion related and behavioral (related to students) to acquire general data that we could use to better understand the dietary patterns of students within the Makerere populace who buy their food.

Table 1: Respondents from Interviews and Questionnaires

Questionnaire and Interview Respondents			
Respondents		No of Respondents	Sampling Method
category	Organization		
students	CHUSS	100	questionnaire
	COCIS	100	
	CEDAT	100	
Doctors	well care clinic	1	Interview
Restaurant	Africa Hall diner	1	
	COCIS restuarant	1	

2 Data Analysis and Findings

2.1 Methods used to analyze the data.

Students' Responses.

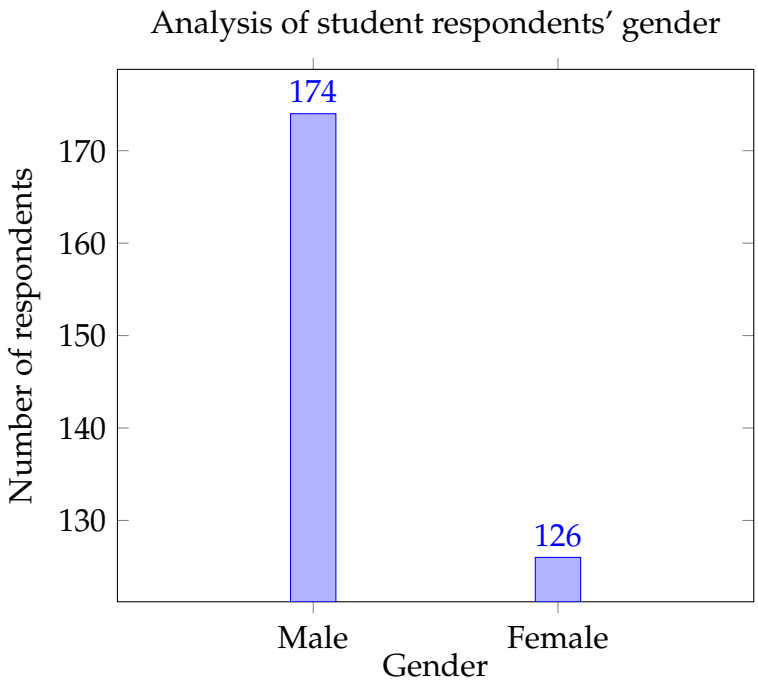
We utilized Excel to summarise and categorize quantitative data from the close-ended questions on the questionnaires. We reviewed the responses from the open-ended questions using a word cloud to determine the similarity between them.

2.2 Presentation of the findings.

2.2.1 Demographics of the repsonses.

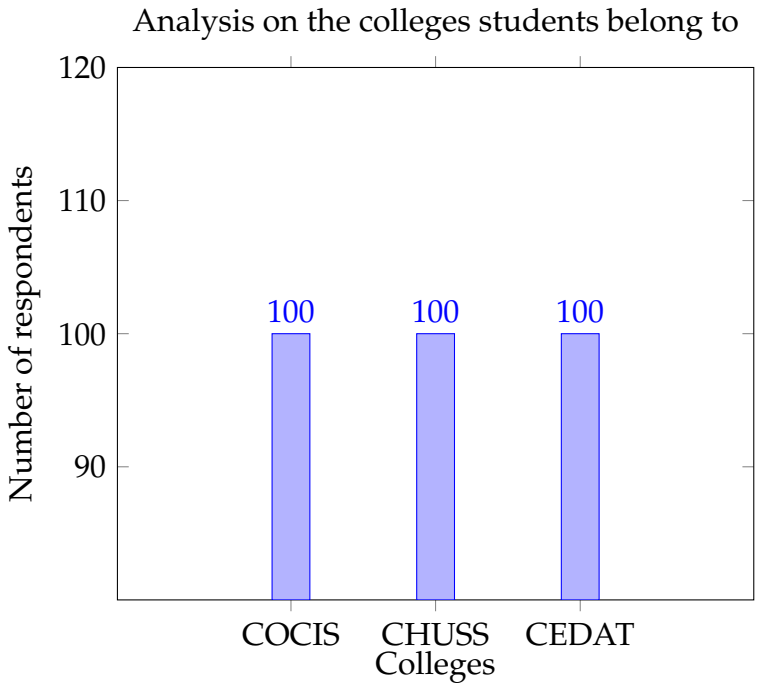
This data was gathered from 300 students belonging to colleges; CHUSS, COCIS and CEDAT.

What is your gender?



In the graph above, we observed that male students responded more than female students.

What college are you from?



In the graph above, we observe that we managed to get 100 responses from our target clusters.

2.2.2 Findings

Our findings were categorized in form of questions answered by 300 respondents as follows.

Do you cook for yourself or buy ready-made food?

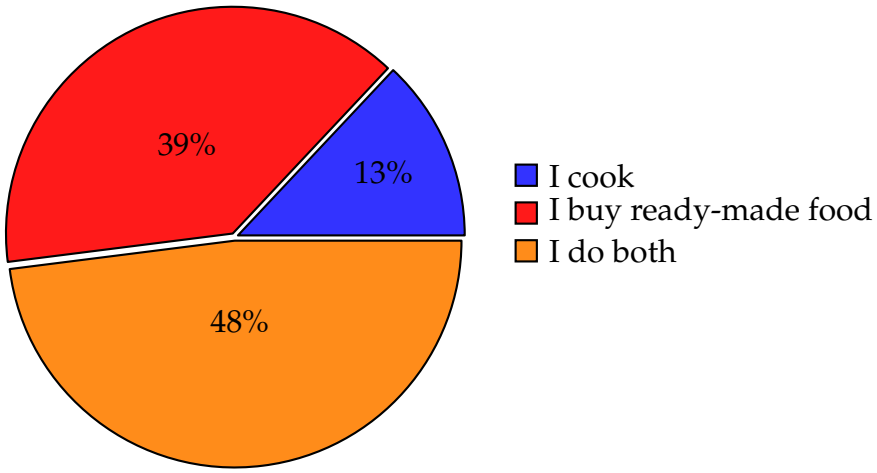
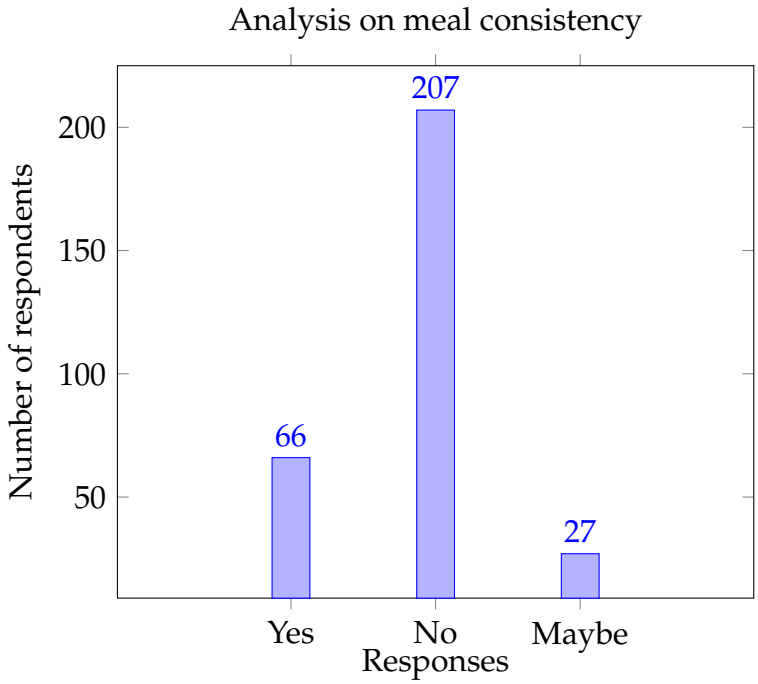


Figure 1: Findings on the kind of food students take.

Do you have a consistent meal plan?



In graph above, we observed 207 students don't have consistent meal plans.

Do you a clear time frame for your meals?

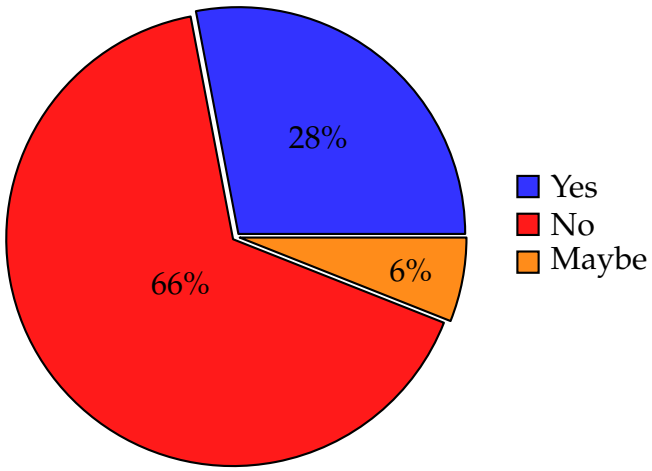


Figure 2: Findings on the time frame of meals.

In figure 2 above, we observed 66% of the students don't have clear time frames for their meals.

How many meals do you have in a day?

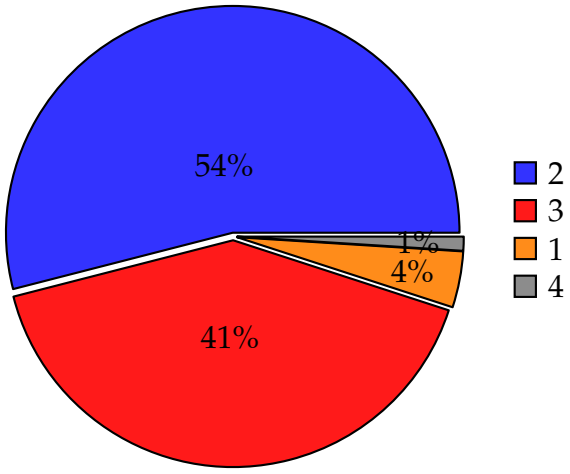


Figure 3: Findings on the number of meals consumed in a day.

In figure 3 above, we observed that over 54% of the students have 2 meals a day.

Are these the same number of meals that you have been consuming since you joined the university?

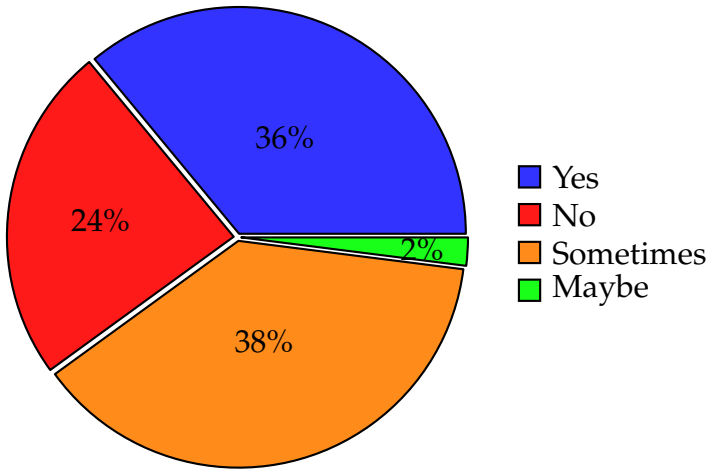


Figure 4: Findings on the change in meals had since joining university.

In figure 4 above, we observed that 38% of the students haven't had a big change in meals since joining university.

Some of the reasons observed as to why students have had a change in the number of meals consumed since joining university are presented in the word cloud below.

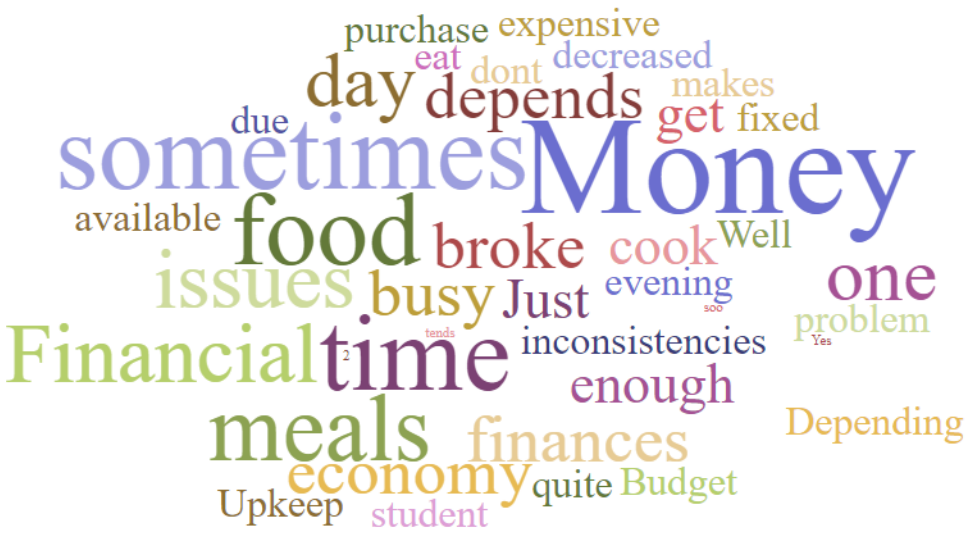


Figure 5: A word cloud showing the responses from students.

Using the word cloud above, we observed most students have had change in the number of meals mainly because of financial issues.

When did you join Makerere University?

300 responses

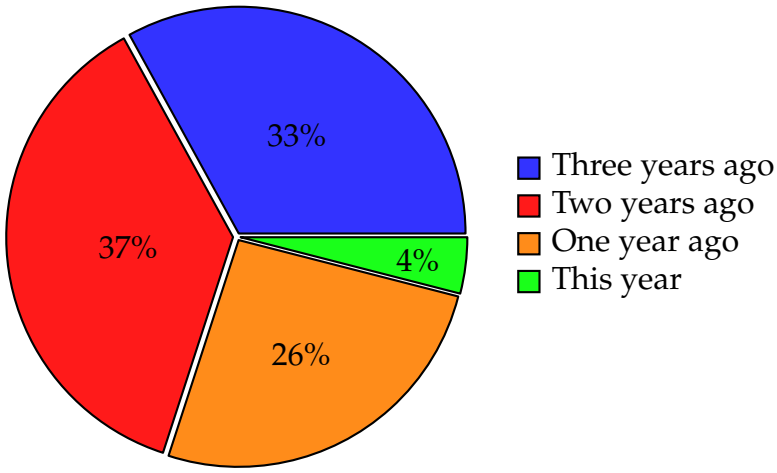


Figure 6: Findings about when the students joined Makerere University.

In figure 6 above, we observed that 37% of the students joined Makerere University two years back.

Qualitatively analyzed response from the Nutrionist.

The responses from the nutrionist from well-care clinic were qualitatively analyzed and these were the key points.

The nutrionist suggested that several factors that contribute to poor eating habits among university students include ignorance, economic standing, and lack of discipline.

He also emphasized the importance of features that point towards mitigation, such as avoiding junk foods that directly invoke chronic illnesses and overly processed foods. Realistic options that promote sustainable work-life balance between healthy and junk foods were also suggested, with the inclusion BMI readings and implementations that come along with the reading.

Regarding the target users of the proposed system, he recommended a focus on university students in the age bracket of 18-30, with a specific emphasis on males. When it comes to nutrients that make up a meal plan, he proposed including Vitamin B (fish, nuts), Magnesium (dark leaf vegetables), Vitamin K, Fibre, and Zinc (chia seeds). He stated proportions aren't necessary.

Regarding meal options, he advised not offering options with more than two starchy foods and adding in enough vegetables and fruits. He also suggested that a standard meal time of 8:00am-8:00pm and three meals in a day be implemented.

Overall, the nutrionist recommended making a flexible meal plan with short notes, many options, and graphics to cater for the needs of university students and promote healthy eating habits.

Qualitatively analyzed responses from Restuarant managers.

The responses from the two different restuarant managers were qualitatively analyzed and these were the key points noted.

The Africa hall restaurant manager provided more detailed and diverse information, including insights on student preferences, cleanliness, ingredients, balanced diet, affordable prices, and favorite dishes. On the other hand, the COCIS restuarant manager was more focused on customer complaints, limited space, and high prices of foodstuffs. Both respondents provided valuable perspectives on the restaurants and their operations, but the Africa hall retsuarant manager's response was more comprehensive.

3 System User Requirements

The following are the users of the system:

System Administrator. System administrators have a higher understanding of how the system will work and have more privileges compared to other users of the system.

Registered users. These include Makerere University students.

3.1 Functional and Non-functional Requirements

3.1.1 Functional Requirements.

These requirements describe what the system should be based on the actor's possible actions.

The functional requirements include;

Registration Module. The system should offer a registration module that allows all new users to register for an account.

Authentication Module. Thesystem should offer an authentication module that allows registered users to log in through their created accounts.

Meal Planning Module. The system should offer a meal planner module that creates and organizes meal schedules thereby allowing users to improve their diet by planning ahead for nutritious meals and tracking their calorie intake. From our findings, we observed that the majority of the respondents didn't have a consistent meal plan. This justifies the need for implementing this feature in the system.

Timely Reminder Module. The system should also provide timely reminder module which notifies the users when a particular meal is meant to be consumed according to the meal plan. Following our findings, the majority of the respondents lacked a clear time frame for ingesting particular meals.

Food suggestions Module. The system should also offer food suggestions module which provides users with a variety of foods locally available to the populace. The findings indicated that most students cook food in addition to buying it in different circumstances. Implementing this module avails many options for the users to choose from.

Nutrition Analysis Module. The system should nutrition analysis module analyzes food inputs and returns a response consisting of an array of different nutrients along with their food values.

BMI calculator Module. The system should also provide a BMI calculator module that informs the user of their height-to-weight ratio. Implementing this module helps users in the bid to track their calorie intake.

3.1.2 Non-functional Requirements.

These requirements specify the criteria that can be used to judge the operation of the system rather than specific behavior. They define system properties and the constraints of the system. The system must show software quality attributes such as accuracy, performance, cost security, and usability. The non-functional requirements include:

- The system should be easy to maintain and adaptable to the users.
- The system should provide forms of data capture during registration and login.
- The system must provide login security at the application level.
- The system should process user requests and return responses in time.
- The system should be operational 24/7.
- The system should be responsive i.e it should provide immediate feedback to users.

3.2 System Requirements.

3.2.1 Software Requirements.

Compatibility is a requirement to ensure that our system has the ability to run and perform required tasks properly. The table below points out the minimum requirements for the system.

Table 2: Software requirements of the system.

Software	**Minimum System Requirements**
Browser	Google Chrome, Mozilla FireFox, Opera Mini, Edge
Database	MySQL
Operating System	All windows operating systems and some distros of Linux e.g Ubuntu
Security	System Authentication

3.2.2 Hardware Requirements.

The system required performing its specific tasks properly on hardware facilities. We carried research in different areas using different kinds of hardware facilities such as Laptops, smartphones and desktops to ascertain the right hardware for optimal system performance.

Table 3: Hardware requirements of the system.

Hardware	Minimum Hardware Requirements
RAM	2GB
Disk Space	10GB

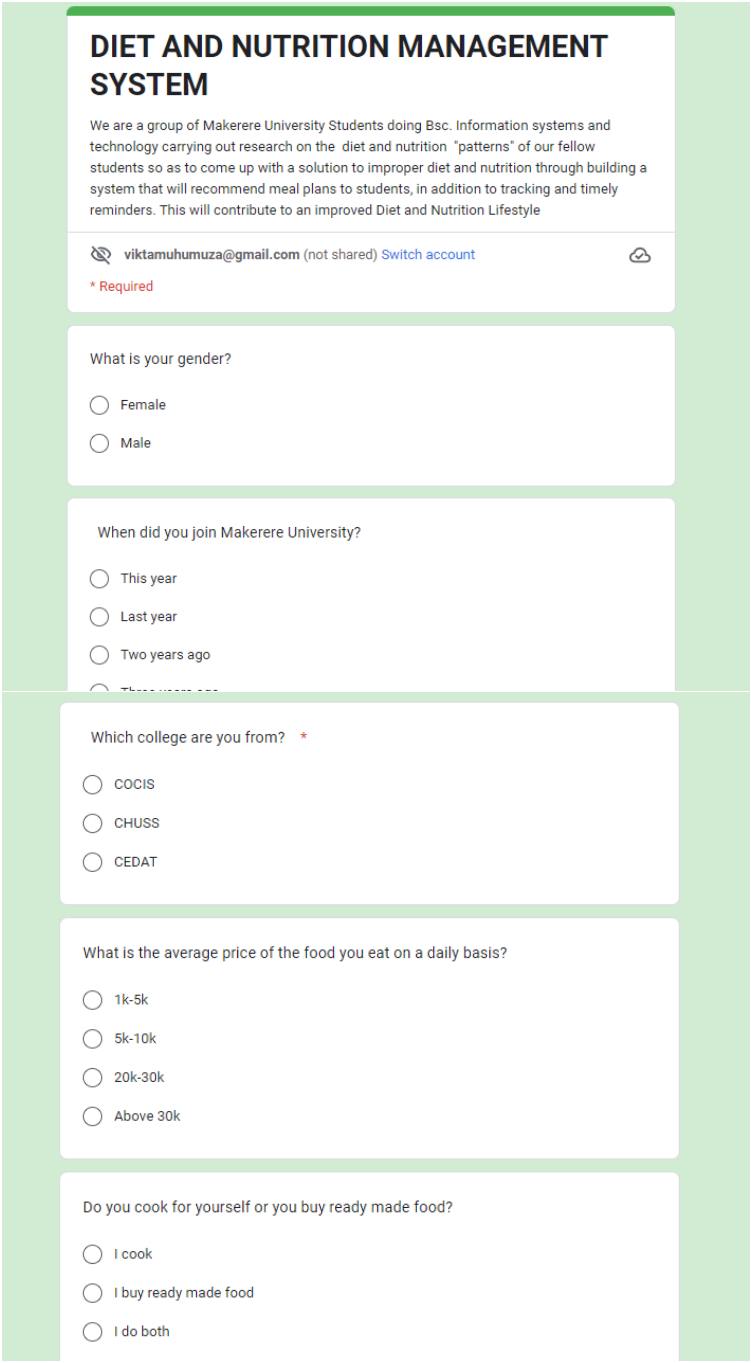
References

Simplelearn. (2023). What is data collection: Methods, types, tools, and techniques. https://www.simplilearn.com/what-is-data-collection-article

Tumwine, S. (2022). Only 10 percent of ugandan children eat a healthy meal, experts reveal. *Newvision*. https://www.newvision.co.ug/category/news/only-10-of-ugandan-children-eat-a-healthy-mea-142394

Appendix A: Students' Questionnaire.

Here is the students questionnaire that was distributed among different colleges in Makerere University.



DIET AND NUTRITION MANAGEMENT SYSTEM

We are a group of Makerere University Students doing Bsc. Information systems and technology carrying out research on the diet and nutrition "patterns" of our fellow students so as to come up with a solution to improper diet and nutrition through building a system that will recommend meal plans to students, in addition to tracking and timely reminders. This will contribute to an improved Diet and Nutrition Lifestyle

viktamuhumuza@gmail.com (not shared) Switch account

* Required

What is your gender?

- Female
- Male

When did you join Makerere University?

- This year
- Last year
- Two years ago

Which college are you from? *

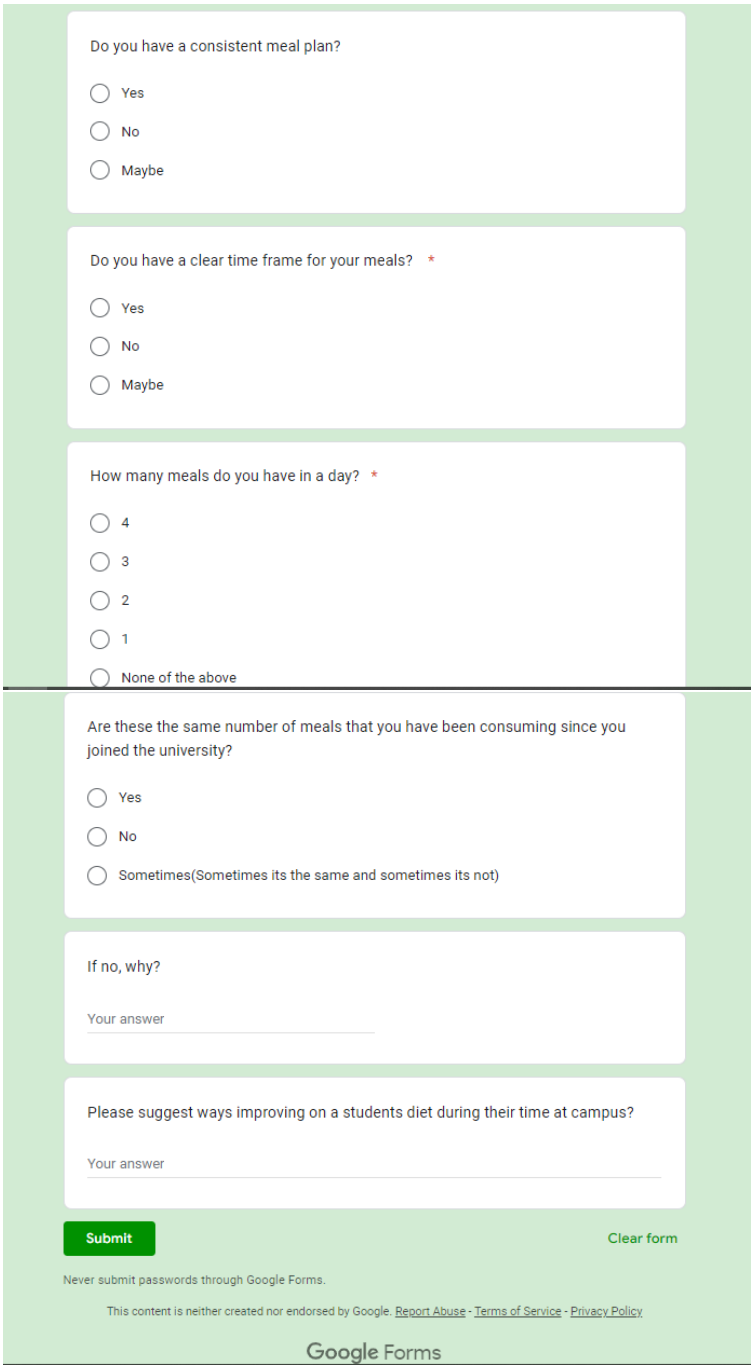
- COCIS
- CHUSS
- CEDAT

What is the average price of the food you eat on a daily basis?

- 1k-5k
- 5k-10k
- 20k-30k
- Above 30k

Do you cook for yourself or you buy ready made food?

- I cook
- I buy ready made food
- I do both


Do you have a consistent meal plan?
Yes
No
Maybe
Do you have a clear time frame for your meals? *
Yes
No
Maybe
How many meals do you have in a day? *
4
3
2
1
None of the above
Are these the same number of meals that you have been consuming since you joined the university?
Yes
No
Sometimes(Sometimes its the same and sometimes its not)
If no, why?
Your answer
Please suggest ways improving on a students diet during their time at campus?
Your answer
Submit
Clear form
Never submit passwords through Google Forms.
This content is neither created nor endorsed by Google. Report Abuse - Terms of Service - Privacy Policy
Google Forms

Appendix B: Doctor's Questionnaire.

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Doctor's Questionnaire-

No.1.What would you say is the biggest cause of an improper diet and nutrition for a person?

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No.2.How best can a person improve their diet and nutrition lifestyle?

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No.3.What features should a diet and nutrition management system have to play this role?

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No.3.What features should a diet and nutrition management system have to play this role?

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No.4.Why do you think so about the above?

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No.5.Which users do you think this system could best serve?

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No.6.Why the above?

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No.7.What nutrients should best consist of a meal plan?

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No.8.Why?

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No.9.What nutrition information do you think would be most important to a user about their food?

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No.9.What nutrition information do you think would be most important to a user about their food?

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No.10.What are your thoughts on students who cook their own food?

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No.11.Do you have any other suggestions to recommend or comments towards the development of the system?

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.....
.....

Appendix C: Restaurant managers' Questionnaire.

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Restaurant Questionnaire -

No.1. Do you produce all the food yourself or do you contract a service provider to produce some of the food? If so do they bring only cooked food or some junk food? if then some examples.

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.....

No.2. Do you prepare only healthy foods or some junk food as well? Some Examples?

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No.3. How would you rate the quality of the food you cook?

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No.4. How often would you say students buy your food?

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No.5. Do you prepare all meals for the day?

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No.6. What are the general comments you get from students concerning your cooked food?

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No.7. What would you say are the most popular food dishes?

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No.8. What are your suggestions concerning student welfare on meals?

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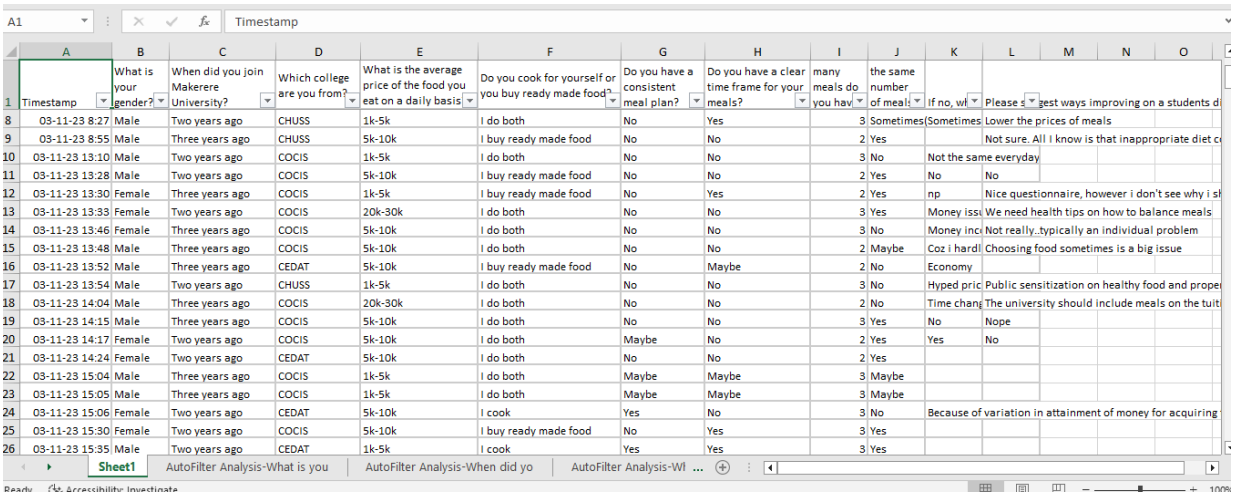
.....
.....

No.9. What complaints do you get from students concerning the cooked food dishes?

.....

Appendix D: Students' Responses.

Some of the responses collected from students concerning the different questions asked in the questionnaire.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Timestamp	What is your gender?	When did you join Makerere University?	Which college are you from?	What is the average price of the food you eat on a daily basis	Do you cook for yourself or you buy ready made food?	Do you have a consistent meal plan?	Do you have a clear time frame for your meals?	many meals do you hav	the same number of meals	If no, wh	Please s	gest ways improving on a students d		
8	03-11-23 8:27	Male	Two years ago	CHUSS	1k-5k	I do both	No	Yes	3	Sometimes	Sometimes	Lower the prices of meals			
9	03-11-23 8:55	Male	Three years ago	CHUSS	5k-10k	I buy ready made food	No	No	2	Yes		Not sure. All I know is that inappropriate diet c			
10	03-11-23 13:10	Male	Two years ago	COCIS	1k-5k	I do both	No	No	3	No	Not the same everyday				
11	03-11-23 13:28	Male	Two years ago	COCIS	5k-10k	I buy ready made food	No	No	2	Yes	No	No			
12	03-11-23 13:30	Female	Three years ago	COCIS	1k-5k	I buy ready made food	No	Yes	2	Yes	np	Nice questionnaire, however i don't see why i sh			
13	03-11-23 13:33	Female	Two years ago	COCIS	20k-30k	I do both	No	No	3	Yes	Money issu	We need health tips on how to balance meals			
14	03-11-23 13:46	Female	Three years ago	COCIS	5k-10k	I do both	No	No	3	No	Money inc	Not really..typically an individual problem			
15	03-11-23 13:48	Male	Three years ago	COCIS	5k-10k	I do both	No	No	2	Maybe	Coz i hardl	Choosing food sometimes is a big issue			
16	03-11-23 13:52	Male	Three years ago	CEDAT	5k-10k	I buy ready made food	No	Maybe	2	No	Economy				
17	03-11-23 13:54	Male	Two years ago	CHUSS	1k-5k	I do both	No	No	3	No	Hyped pric	Public sensitization on healthy food and prope			
18	03-11-23 14:04	Male	Three years ago	COCIS	20k-30k	I do both	No	No	2	No	Time chan	The university should include meals on the tuit			
19	03-11-23 14:15	Male	Three years ago	COCIS	5k-10k	I do both	No	No	3	Yes	No	Nope			
20	03-11-23 14:17	Female	Two years ago	COCIS	5k-10k	I do both	Maybe	No	2	Yes	Yes	No			
21	03-11-23 14:24	Female	Two years ago	CEDAT	5k-10k	I do both	No	No	2	Yes					
22	03-11-23 15:04	Male	Three years ago	COCIS	1k-5k	I do both	Maybe	Maybe	3	Maybe					
23	03-11-23 15:05	Male	Three years ago	COCIS	1k-5k	I do both	Maybe	Maybe	3	Maybe					
24	03-11-23 15:06	Female	Two years ago	CEDAT	5k-10k	I cook	Yes	No	3	No	Because of variation in attainment of money for acquiring				
25	03-11-23 15:30	Female	Two years ago	COCIS	5k-10k	I buy ready made food	No	Yes	3	Yes					
26	03-11-23 15:35	Male	Two years ago	CEDAT	1k-5k	I cook	Yes	Yes	3	Yes					

26	03-11-23 15:35	Male	Two years ago	CEDAT	1k-5k	I cook	Yes	Yes	3	Yes		
27	03-11-23 15:36	Female	Three years ago	COCIS	5k-10k	I do both	No	No	3	No	I did not have the capacity to consume all three meals dail	
28	03-11-23 15:37	Female	Two years ago	COCIS	1k-5k	I cook	Yes	No	2	Yes		
29	03-11-23 15:37	Female	Last year	CEDAT	5k-10k	I buy ready made food	No	No	2	Yes		
30	03-11-23 15:38	Female	Last year	COCIS	1k-5k	I cook	Yes	Yes	3	Yes		
31	03-11-23 15:39	Male	Two years ago	CEDAT	5k-10k	I buy ready made food	No	No	2	No	Sometimes	poor planning makes me have shorter meals
32	03-11-23 15:40	Male	This year	COCIS	1k-5k	I cook	Yes	Yes	4	Yes		
33	03-11-23 15:42	Male	Three years ago	CEDAT	20k-30k	I buy ready made food	Yes	Yes	3	Yes		
34	03-11-23 15:52	Male	Three years ago	COCIS	5k-10k	I do both	No	Yes	3	Yes		
35	03-11-23 15:52	Female	Two years ago	CEDAT	20k-30k	I do both	Maybe	No	2	No	Sometimes	Am not sure
36	03-11-23 15:54	Female	Last year	COCIS	20k-30k	I buy ready made food	No	Yes	3	Yes		
37	03-11-23 15:58	Male	This year	COCIS	5k-10k	I do both	Yes	No	3	Yes		
38	03-11-23 16:08	Male	Two years ago	COCIS	5k-10k	I do both	No	No	2	No		
39	03-11-23 16:10	Female	Three years ago	COCIS	1k-5k	I do both	Maybe	Maybe	3	Maybe		
40	03-11-23 16:11	Male	Last year	CEDAT	5k-10k	I cook	Yes	Yes	3	Yes		
41	03-11-23 16:28	Male	Three years ago	COCIS	5k-10k	I do both	No	No	3	Yes		No
42	03-11-23 16:35	Male	Two years ago	CHUSS	5k-10k	I buy ready made food	Yes	Yes	2	Sometimes	Sometimes	More information about restaurant through rat
43	03-11-23 16:43	Male	Three years ago	COCIS	1k-5k	I buy ready made food	No	No	2	No	Sometimes	If students could get food at affordable prices a
44	03-11-23 17:02	Female	Two years ago	CHUSS	1k-5k	I buy ready made food	No	No	2	No	Appetite de	Introducing more healthy foods