RESEARCH AND DEVELOPMENT OF AN ONLINE PORTAL TO HELP IN REDUCING

THE LEVEL OF OBESITY IN UNIVERSITY STUDENTS

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Abstract

Obesity is a significant problem in Jamaica; one in two adults in Jamaica are obese. The objectives of our research are to identify contributing factors to obesity among students of the University of Technology, Jamaica, and to educate students about the dietary and lifestyle measures needed to prevent/control obesity. The aim of this study is to assess the extent to which an online portal (Healthy Start) can be used to reduce the levels of obesity in Jamaican university students. Fifty students were assigned to the Healthy Start (experiment) group for internet-based intervention i.e., information on healthy lifestyle and diet were provided via the internet. Fifty students were assigned to the control group, where pamphlets containing health education were provided. Body mass index (BMI) was taken at the beginning and after 5 weeks of intervention. Based on the results from the Paired Sample Test, the researchers found that Healthy Start had no significant effect in reducing BMI of university students.

Keywords: non-communicable disease, body mass index, obesity, overweight, m-health, web portal.

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Chapter 1: Introduction

According to the World Health Organization (WHO), 71% of all deaths worldwide are caused by Noncommunicable diseases (NCDs).The majority of such deaths were caused by the four main NCDs, namely: cardiovascular disease (17.9 million deaths; accounting for 44% of all NCD deaths); cancer (9.0 million deaths; 22%); chronic respiratory disease (3.8 million deaths; 9%) (World Health Statistics, 2018). Also, 82% of the 16 million premature deaths relating to NCDs, occur in low- and middle-income countries (LMICs) (WHO, 2018).

With the largest NCD prevalence occurring in LMICs, the prevention and control of NCDs is an urgent development issue. NCDs result in major healthcare costs and loss of productivity, which negatively impacts economies and health security worldwide (NCD Alliance, 2018). In addition, projected NCD economic losses are estimated at $500 billion per annum in low- and middle-income countries (CDC, 2018).

Two major factors that contribute to NCDs are Modifiable behavioural risk factors and Metabolic risk factors. Modifiable behaviours, such as tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol, all increase the risk of NCDs. Metabolic risk factors include; raised blood pressure, overweight/obesity, hyperglycemia (high blood glucose levels) and hyperlipidemia (high levels of fat in the blood) (WHO, 2018).

The World Health Organization defines overweight and obesity as abnormal or excessive fat accumulation that presents a risk to health. Obesity is linked to major non communicable diseases. Adult obesity is associated with significantly increased risk of a range of morbidities and mortality, including type II diabetes, cardiovascular disease and cancer (Simmonds, Llewellyn, Owen & Woolacott, 2015). Obesity and overweight have assumed epidemic proportions in the region of the Americas, which now is the region with the highest prevalence

among all the World Health Organization regions: 62% of adults are overweight or obese

(PAHO, 2018). Taking measures such as improving your eating habits and physical activity are

crucial in the fight against obesity ("Obesity Prevention", 2018).

One in two Jamaicans (54%) are classified as overweight (pre-obese or obese) (Jamaica

Health and Lifestyle Survey III, 2018). President of the Jamaica Association of Professionals in

Nutrition and Dietetics (JAPINAD), Vanessa White-Barrow, says that a healthy diet consisting

largely of fruit and vegetables plays an important role in weight control (Williams, 2017).

Data from the 2007-2008 Jamaica Health and Lifestyle Survey II conducted by the

National Health Fund (NHF) and the University of the West Indies (UWI), of persons aged 15 to

74, indicated that nearly half of the population is not consuming enough nutrient-rich foods

(Jamaica Health and Lifestyle Survey II, 2008). Also, the findings of a recently conducted study

of the association of dietary fiber intake with reducing NCDs in four countries (including

Jamaica) supports the need to incorporate strategies and policies to promote increased dietary

fiber intake as one component for the prevention of NCD risks in all countries (Lie, et al., 2018).

Nowadays many persons browse the internet to find solutions to their everyday problems

or just to become up to date with different things in the world. In 2018, internet users worldwide

surpassed the 4 billion mark (Kemp, 2018). In addition to this massive user-base, the internet is a

means of attraction, which could be used as a medium to inform individuals on healthy food

choices.

In 2016, 83.8 % of households in Jamaica had access to mobile phones, 39.7% had

internet access and 34.9% of households have a computer (Statistical Institute of Jamaica, 2017).

Studies into mobile health (m-health) suggests it reduces obesity (Wang, et al., 2017). However, m-health interventions mainly focus on the monitoring of physical activity and NCDs, and less effort on promoting healthy eating habits.

1.1 Research Problem

Obesity is on the rise in Jamaica; preliminary key findings from the Jamaica Health and Lifestyle Survey III (2016-2017) suggests that one in two Jamaicans (54%) are classified as overweight (pre-obese or obese). According to the Heart Foundation of Jamaica, excess sugar consumption is a major cause of obesity and its related diseases, as excessive sugar intake causes increased risk of developing NCDs (Harris, 2017). Currently, the Ministry of Health has taken several initiatives towards prevention and control of NCDs with the aid of national programmes, campaigns and the Jamaica Moves initiative which promotes exercising and eating healthy (Patterson, 2018). Internet-based intervention programs can used as an effective medium towards preventing and controlling obesity (Mohammed Nawi & Che Jamaludin, 2015). With increased internet usage worldwide and locally, the problem of obesity in Jamaica was researched from a technological perspective.

1.2 Purpose

The purpose of this study is to assess the extent to which an online portal can be used to reduce the level of obesity in Jamaican university students.

1.3 Limitations

In carrying out this research, there will be a few limitations the researchers might face. One such limitation is the constraint of time. The researchers may not be able to accurately tell if the proposed system is going to in fact help in the reduction of obesity in university students based on the time taken to carry out research and to develop the system. Another limitation is that persons may be unwilling to participate in the research because they are afraid to admit that they are overweight or obese.

1.4 Delimitation

The scope of this research will be focused on students at the University of Technology, Jamaica.

1.5 Research Questions

What is the extent to which an online portal can assist in reducing the level of obesity in Jamaican university students?

Sub-questions:

1. What eating behaviours are associated with students who are overweight/obese?

2. To what extent do participants utilize the internet intervention?

3. What effect the web portal has on the BMI of students?

1.6 Significance

The results from this research may add value to the health sector in Jamaica by reducing NCDs and the major risk factor obesity. In addition, this research may contribute to the gap in knowledge that exists regarding the use of online portals to reduce obesity in Jamaica.

1.7 Definition of Key Terms

- **NCD-** A non-communicable disease (NCD) is a medical condition or disease that is not caused by infectious agents (non-infectious or non-transmissible). NCDs can refer to chronic diseases which last for long periods of time and progress slowly.

- **BMI -** Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness.

- **Obesity-** A person with a BMI of 30 or more is generally considered obese.

- **Overweight-** A person with a BMI equal to or more than 25 is considered overweight.

- **m-Health-** is an abbreviation for mobile health, a term used for the practice of medicine and public health supported by mobile devices and the internet.

- **Online Portal**- refers to the webpage (or website) that provides users an entryway to a variety of information, tools, links, products and services.

Chapter 2: Literature Review

2.1 Introduction

Globally, obesity has nearly tripled since 1975. In 2016, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 650 million were obese (WHO, 2018). Several initiatives have been taken internationally and locally to reduce the medical condition. However, much more needs to be done to significantly reduce the condition. Planning healthy meals plays a vital role in the reduction of obesity, and it could possibly assist the government in its Jamaica Moves campaign.

The topic being discussed takes the form of a question. How can the use of an online portal assist in reducing the level of obesity in Jamaican university students? Through our study we intend to understand the relationship between providing information on nutritive food solutions to university students via a web portal, and the potential impacts it has on the level of obesity in Jamaica.

2.2 Prevalence of obesity in Jamaica

According to Nutritionist Fitzroy Henry, a Professor of Public Health at the University of Technology, Jamaica, obesity rates among adults have increased by one percent, each year, since 2002. Professor Henry, who chairs the National Food Industry Task Force (NFITF), locally, states that obesity rates among adults moved from 45 per cent in 2002 to 54 per cent in 2008, and 60 per cent in 2016 (Hibbert, 2017). "The main causes of death in Jamaica include heart disease, hypertension, cancer, diabetes, stroke, which are all related to obesity. When we look at the Caribbean figures, obesity is increasing exponentially. It is females more than males, but the males are catching up fast," the professor said. The figures represent serious implications for public health including an increased risk of cardiovascular diseases such as diabetes and hypertension.

The ministry and its partners are working on implementing innovative solutions to address the condition under the National Strategic and Action Plan for the Prevention and Control of Non-Communicable Diseases (NCDs) in Jamaica from 2013 to 2018 (Williams, 2017). According to the World Health Organization (WHO), in 2016, 26.8% of Jamaica's population suffered from obesity. One in two Jamaicans (54%) are classified as overweight (pre-obese or obese) (Jamaica Health and Lifestyle Survey III, 2018). In 2017, Dr. Christopher Tufton, Minister of Health, said that a study done earlier this year in the Jamaican student population has shown that over a seven-year period, there has been a 100% increase in obesity in boys and between 60 and 70 per cent in girls. In light of this trend, the ministries of health and education are developing a nutrition policy for all schools that will be implemented in January 2019 in an effort to also prevent NCDs.

2.3 Use of a balanced diet in reducing obesity

According to Krans (2016), a balanced diet is one that gives your body the nutrients it needs to function correctly. The British Nutrition Foundation states that consuming more calories than we need over a period of time will cause weight gain. This is because any extra calories we consume but we don't use, will just be stored as fat. In order to get the proper nutrition from your diet, majority of your daily calories should be consumed from fresh fruits and fresh vegetables (Krans, 2016).

In a research done in 2013, it was seen where the serving of Sugar-sweetened beverages (SSB) was associated with greater weight gain while greater consumption of fruits, vegetables, nuts, etc., resulted in less weight gain. These results suggest that obesity prevention should focus on improving overall dietary quality by consuming more healthful foods and beverages and fewer unhealthy ones (Hu, F. B., 2013).

Drinking enough water every day is good for overall health. Plain drinking water has zero calories so it can also help with managing body weight and reducing caloric intake when substituted for drinks with calories, like regular soda or SSBs. Increased vegetable and fruit consumption are encouraged to promote health, including the maintenance of a healthy body weight. Overall, fruit & vegetable consumption either induces a decrease in body weight or a lower weight gain as part of a larger dietary change pattern that includes intakes of less energy dense foods, and higher intakes of fibre and associated micronutrients (Schwingshackl, et al., 2015).

In 2015, the Ministry of Health launched the Food Dietary Guidelines to promote healthy lifestyle habits to ward off NCDs. The manual provides broad guidelines for healthy food portions, such as increased fruit and vegetable consumption and proper food-preparation

techniques. It also advises persons on items that should be reduced or removed from the diet,

such as excess salt, sugar and processed foods. Vanessa White-Barrow, the 2017 President of

the Jamaica Association of Professionals in Nutrition and Dietetics, said that a healthy diet

consisting largely of fruits and vegetables play an important role in weight control (Williams,

2017). The findings from a study done in 2018, corroborate with many other studies, finding

that dietary fibre may have a protective effect against the risks of you having diabetes, heart

disease or stroke (Lie, et al., 2018). The Ministry also deploys health workers and health-

promotion officers to educate persons on healthy dietary practices.

2.4 How the internet improves health

Consumer health is one of the areas that could be most dramatically reshaped by the

internet. It refers to the decisions you make about the purchase of products and the use of health

information and services that will have a direct effect on your health (Abundo, B.J, 2015). It

tends to furnish consumers with the data expected to enhance their wellbeing. The Internet

could turn into a huge empowering agent of customer wellbeing as it gives an accessible

communication channel for a developing fragment of the population. Since the mid-1960's,

patients have been urged to play a more dynamic job in their very own human services, and care

providers have perceived the benefit of drawing in patients to take an interest all the more

definitely in their own care. This in turn, abbreviated hospital stays and expanded the

requirement for patients and their families to see how to give care to themselves (National

Research Council (US), 2012). The Web offers the opportunity for enhanced checking of

consumer health and, possibly, arrangement of in-home care which aims to aid the early

recognition of potential medical issues and to decrease the requirement for clinical intercession

and healing center stays.

In today's society, the population relies heavily on technology or the internet to gain

information and to do research. The information gathered can be valuable especially when it

comes to healthcare (South University, 2016). The advantages of the internet being a source of

health information include convenient access to a large volume of information, ease of updating

information and the potential for interactive sites that promote understanding and the retention

of information. The web permits patients, as well as the total population to be better educated

which can prompt better health results, better utilization of health service assets and a more

grounded connection between a doctor and their patients.

Individuals are utilizing the web as a source to inquire about their medical complications.

The overall web is overwhelmed with an assortment of medical problems, their symptoms and

treatments which causes the overall population to make the best possible strides when it hits on

therapeutic medicines. Medicinal services administrations have been propelling campaigns

through web-based life to talk about great health practices and additionally doing live visits with

attendants and specialists to assist individuals with various medical issues. The web has likewise

enhanced doctors' skill by enabling them fast access to online medicinal databases which

enhances the manner in which specialists treat their patients. Communication technologies, for

example, email, texting or instant messaging have enabled doctors to counsel partners from any

part of the world to enable them to guide their patients. This has given a rise to a new trend

called 'Telemedicine', which can be useful for patients who do not have access to medical

facilities (Nowitz, 2017).

2.5 Technology used to assist obesity patients.

According to Bacigalupo et al. (2013) there is strong research evidence for short-term and moderate evidence for medium-term weight loss through use of mobile technologies as part of intervention delivery.

Web applications have some effect on reducing obesity. In a study which had sixteen trials, twelve interventions achieved weight loss (range: 0.08 kg – 5.4 kg) compared to controls, while 5 of patients lost at least 5% of baseline weight (Levine, Savarimuthu, Squires, Nicholson, & Jay, 2014). In addition, the trial duration and attrition ranged from 3–36 months and 6–80 %, respectively. Ten studies reported results after at least 1 year of follow-up. Interventions used various forms of personnel, technology modalities, and behaviour change elements; trials most frequently utilized; medical doctors (44%), web-based applications (63%), and self-monitoring (81%), respectively.

In the International Journal of Behavioral Nutrition and Physical Activity (2016) evidence base is largest for the use of apps to increase physical activity in adults. Fewer interventions have used apps to improve dietary and sedentary behaviours, and very few app interventions have targeted children and adolescents. In addition, multi-component interventions are needed that combine apps with other intervention strategies appear to be more effective than stand-alone app interventions. Hence, the web portal could possibly work alongside the Jamaica Moves campaign to see if both components could work together to create a dent in the obesity crisis.

2.6 Online portals in obesity

The development of strategies to reduce or maintain a healthy weight in adults and adolescents is a well-recognized need. This has led to many other individuals conducting similar research to that of this group.

A 3 months randomized controlled trial research was done by the Department of Health at the University Kebangsaan Malaysia Medical Centre in 2015. Its goal was to determine the effectiveness of an internet-based intervention, called "obeseGO!", on obesity among adolescents in Kuala Lumpur. Forty-seven students (47) were randomly assigned to "obeseGO!" (intervention group) and Fifty (50) were assigned to the control group. The control group had no access to the intervention but were given pamphlets containing guidelines on how to maintain a healthy weight. The research lasted for 12 weeks and data such as their body mass index, waist circumference and body fat percentage were recorded before and after the intervention. The results had shown that "obeseGO!" had more effect in reducing and controlling weight than the pamphlets (Nawi, A.M., Jamaludin, F.I.C, 2015).

Another similar research was done using an e-therapeutic platform called "Next.Step" with the same aim as the one mentioned in the previous paragraph. The research used 80 adolescents, where 40 were assigned to the control group and 40 to the experimental group which had access to the platform. The research was also conducted over a 12-week period and concluded that a web-based intervention is more effective than the standard intervention (Sousa, P., Fonseca, H., Gaspar, P., Gaspar F., 2015).

Internet-based obesity prevention program have seen success in Thailand. A study was done in the country to prevent obesity in Thai children because of a rise in the prevalence of

overweight and obese individuals. The results show that an internet-based intervention was

effective in modifying the BMI of Thai children (Rerksuppaphol & Rerksuppaphol, 2017).

2.7 Summary

Since 2002, obesity rates in Jamaica have increased gradually over the years, and in 2016, 26.8% of the population suffered from obesity. Obesity leads to noncommunicable diseases such as hypertension, diabetes and stroke which are amongst the main causes of death in Jamaica today. Even though the ministry is working on implementing solutions to reduce the levels of obesity, there are certain things that the population can do to prevent them from being overweight, such as exercising, and planning healthy meals. Healthy foods play an important role in weight control. Foods such as fruits, vegetables and nuts produced better results as it relates to weight loss, than when consuming sugar sweetened beverages. Dietary fibre helps to fight against cardiovascular diseases and diabetes; thus, an increase of fruits and vegetables is required in the diet to promote health and to maintain body weight.

The use of apps as a part of intervention delivery, has also resulted in weight loss. In a study, it was shown that 75% of interventions achieved weight loss while 5-45% of patients lost at least 5% of baseline weight. However, most interventions are used to promote physical activities in adults. In the case of the "ObeseGO!" experiment, recommendations were made to do further research on the use on internet-based intervention in the reduction of obesity in adults (Nawi, A.M., Jamaludin, F.I.C, 2015).

The internet contains a variety of information that consumers can use to improve their health. Certain websites allow the population to increase their knowledge as it relates to illnesses, their symptoms and their treatments. With this information, persons can take better care of themselves and possibly reduce their number of hospital visits. Also, the information presented on the internet can assist doctors by allowing them the ease of access to medical databases online

or to gain advice from other specialists in any part of the world, to better assist them when

dealing with or diagnosing patients.

Chapter 3: Methodology

3.1 Research Design

This research was based on a quantitative research approach where the quasi-experimental design (pretest-posttest design) was applied. The aim of this study was to measure if university students' weight will; improve, decline or remain stagnant with the implementation of a web portal to provide information about a healthy lifestyle.

After the sample selection criteria were met, the experiment consisted of students being divided into two groups labelled Group A and Group B. Group A was the experimental group, the group with access to the web portal, whilst Group B was the control group, the group without access to the portal, with no random assignments being given to either group. At the beginning of the experiment a pre-test was given to each of the groups, consisting of a comparison of BMI (body mass index). When the results of the test were received from each group, and averaged, this average was used as the baseline for the experiment. After this pre-test is done the web portal was introduced to the experimental group. Both groups were introduced to the same healthy meal planning information for the experimental period. At the end of this study a post-test was given from which the average of the results was compared to that of the average of the pre-test results. This determined if there has been an improvement, decline or no-effect on student's weight due to the usage of the web portal.

3.2 Population

The target population for this research was the students at UTECH.

Sample Size

A previous study was done in Malaysia which involved 45 intervention subjects and 45 control subjects so as to reject the null hypothesis. Thus, a sample of 45 subjects along with a 20% dropout rate was considered, a total sample size of 108 was considered (Nawi & Jamaludin, 2015).

The survey was done on the University of Technology, Jamaica's main campus which consists of approximately 10,000 students. The survey followed a similar sample size as the research done in Malaysia. A sample size of 100 individuals who meet the inclusion criteria was selected. Each group in the experiment consisted of 50 individuals. The sample was selected from UTECH because the institution consists of individuals from various backgrounds and different geographical location within Jamaica.

Sample Selection

Participants were selected based on convenience sampling; the selection of units from the population is based on easy availability and/or accessibility. In addition, the target population was selected based on persons with a body mass index (BMI) of 25 kg/m² or more (overweight according to the W.H.O) and persons that have access to the internet. This information was obtained during the interview session, then after questionnaires were distributed to the respondents, based on the results, groups were determined.

3.3 Instruments for Data Collection

All the data necessary to conduct the study was collected via survey using questionnaires, interviews, analog scale and tape measure.

Quantitative Data

Questionnaire: Eating Behaviour (Schlundt DG, Hargreaves MK, Buchowski MS, 2003) (shortened version) self-administered structured questionnaires containing closed ended questions were distributed to individuals within the sample group. These questionnaires consisted of twenty-six (26) questions that sought to obtain basic information about the respondents' demographic, and six other categories, namely, low-fat eating, snacking and convenience, emotional eating, planning, meal skipping, and lifestyle behaviour. Each questionnaire provided a cover letter that introduced the researchers, briefly stated the purpose of the study and guaranteed participant confidentiality. A similar letter was also made present during each interview that was conducted.

Pre-testing: Questionnaires were pre-tested using friends and associates who provided feedback. This feedback was used to improve the quality of the questions which improved the clarity, reliability and validity of the questionnaires.

Interview: Interviews were conducted using the face-to-face method to obtain information about the participants' BMI (body mass index). The purpose and format of the interview was explained to the participants and they were assured that their information was kept confidential. All information gathered from the interviews was recorded immediately to avoid any errors. Interviews provide flexibility and allows the researcher and respondents to provide clarification or meanings. All respondents were interviewed using a structured list of five (5) open ended questions, before they completed the questionnaires. The time limit for each interview was ten (10) minutes and each session was recorded for reviewing purposes.

Analog Scale

An analog scale was used by the researchers to measure the weight of participants. The scale was placed on a flat surface, and participants were asked to remove their shoes before measurements were taken. Each participants' weight was measured three (3) times then averaged to get an average reading. After each measurement the scale was set to zero as to reduce errors.

Tape Measure

A tape measure was used to measure the height of each participant. Participants were standing next to a wall, with shoes and hats removed before measurements were taken. Each participants' height was measured three (3) times then averaged to get an average reading. This was done to reduce errors.

3.4 Data Analysis

The data collected in this study was analyzed using Descriptive Analysis. The Statistical Package for Social Sciences (SPSS Version 23) software program was used to produce graphical representations of statistical data and calculations. In addition, the researchers were able to analyze data using descriptive statistics (mean, variance, standard deviation) and bivariate analysis (crosstabs).

Microsoft Excel was also be utilized to record information and present findings.

Exclusion Criteria

- Persons at normal weight
- Children

Limitations

The limitations that were faced by the researchers during the process of carrying this study

include:

1. Participants decided to withdraw from the study

2. Participants may not have been completely truthful in their responses on the questionnaires or

during the interview and may have answered how they assumed the researchers wanted them

to answer, which would make the data inaccurate.

4. Participants had a negative perception towards weight measurement and obesity in general.

5. Financial constraints of participants to afford to choose healthy food options.

6. The time the survey was done – in the middle of preparation for end of term and final exams,

so participants were preoccupied with studying.

3.5 Ethical Considerations

In conducting the research, the researchers took into consideration the privacy and safety

of the identity and the information obtained from the participants. The rights of participants are

also fundamental when doing a research. The researchers obtained consent from participants and

an overview of their rights were given. Each of the participants had the right to decide which

activities he/she was willing to take part in. The participants were also given the chance to

discuss their participation in the study with their family and/or physician before deciding to

participate.

The participants' information was not be displayed publicly, and no names or personal

information was disclosed to anyone without full permission of the participants. At the end of the

research, participants were able to discuss the findings with the researchers. Debriefings helps to rule out any misconceptions and give the participant closure.

3.6 Timeline

The study was conducted over a four (4) month period between the months January 2019 and April 2019. A time frame of 12 weeks was done in a similar research in Malaysia which (Nawi & Jamaludin, 2015).

Chapter 4: Findings

4.1 Introduction

This project is based on a current research that was conducted, titled "Research and development of an online portal to help in reducing the level of obesity in university students". The purpose of this study was to assess the extent to which an online portal can be used to reduce the levels of obesity in Jamaican university students.

The study aimed to evaluate whether a technological solution centered on web portals could be used to reduce obesity in Jamaica. In this section we will speak on the after effects of our discoveries with respect to the receptiveness of participants on the Healthy Start web portal. Consequently, we plan to answer the inquiries "What is the extent to which an online portal can assist in reducing the level of obesity in Jamaican university students?", and the following sub research questions:

1. What eating behaviours are associated with students who are overweight/obese?

2. To what extent do participants utilize the internet intervention?

3. What effect the web portal has on the BMI of students?

4.2 Part A

Gender of Paarticipants

Gender
- Male
- Female

39.00%
39

61.00%
61
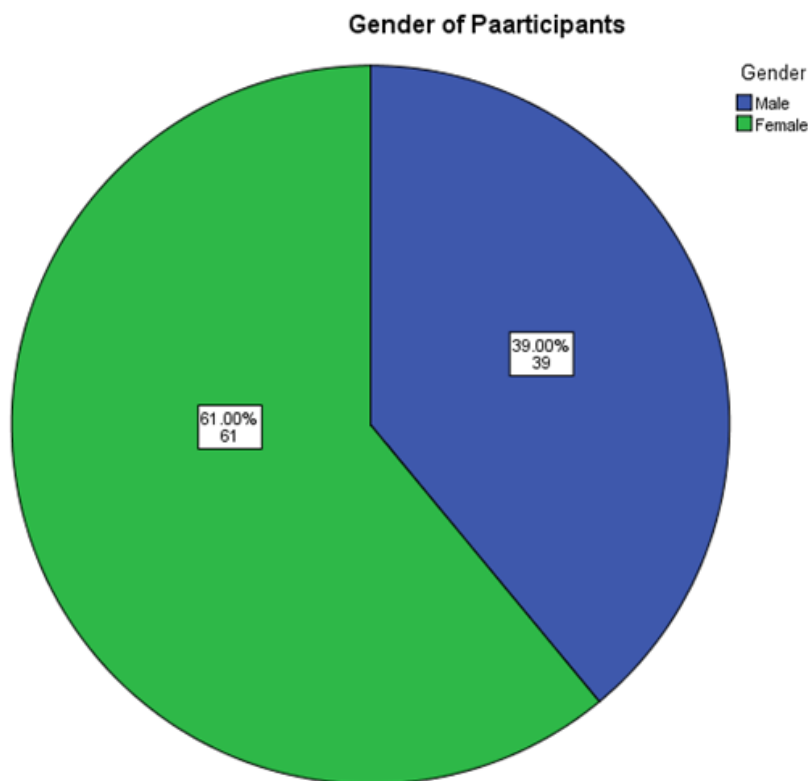
Figure 1. Pie Chart showing the gender of Participants

Figure 1 shows that majority of the sample population are females with the higher frequency. This accounted for sixty-one percent (61%) of the targeted population and had a frequency of sixty-one out of one hundred (61/100) respondents. The males represented thirty-nine out of 100 participants, which represents 39% of the targeted population.

Frequency Table

Table 1 shows Frequency Table for Age Demographic

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30	70	69.3	70.0	70.0
	31-40	9	8.9	9.0	79.0
	41-50	18	17.8	18.0	97.0
	51 and over	3	3.0	3.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Table 1 concluded that majority of the sample population are in the early stage of adulthood as the age group with the highest frequency is 18-30. This accounted for seventy percent (70%) of the targeted population and had a frequency of seventy out of one hundred (70/100) respondents. Age groups 31– 40,41-50 and 51 and over were all trailing behind with frequencies of 9, 18 and 3 out of 100 respectively, which represents 9%, 18% and 3% of the targeted population each.

4.3 Part B

Summary of Eating Behaviour Patterns Questionnaire results based on six-factor model.

Table 2 shows participants' responses to Factor 1: Low-fat Eating

		Responses		Percent of Cases
		N	Percent	
Low-fat	Strongly Agree	53	13.3%	53.0%
eating	Agree	102	25.5%	102.0%
	Neutral	132	33.0%	132.0%
	Disagree	70	17.5%	70.0%
	Strongly Disagree	43	10.8%	43.0%
Total		400	100.0%	400.0%

It can be seen from table 2 above that participants' perception on low fat eating, 61.3% of respondents either were not sure or disagreed with low-fat eating, while 38.7% agreed to low-fat eating.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, are unsure or disagree to low-fat eating.

Table 3 shows participants' responses to Factor 2: Emotional Eating

		Responses		Percent of Cases
		N	Percent	
Emotional	Strongly Agree	36	9.0%	36.0%
eating	Agree	95	23.8%	95.0%
	Neutral	66	16.5%	66.0%
	Disagree	106	26.5%	106.0%
	Strongly Disagree	97	24.3%	97.0%
Total		400	100.0%	400.0%

It can be seen from table 3 above that participants' perception on emotional eating, 67.3% of respondents either were not sure or disagreed with emotional eating, while 32.7% agreed to emotional eating.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, are unsure or disagree they eat based on their emotions.

Table 4 shows participants' responses to Factor 3: Snacking on Sweets

		Responses		Percent of Cases
		N	Percent	
Snacking and	Strongly Agree	75	18.8%	75.0%
convenience	Agree	118	29.5%	118.0%
	Neutral	61	15.3%	61.0%
	Disagree	69	17.3%	69.0%
	Strongly Disagree	77	19.3%	77.0%
Total		400	100.0%	400.0%

It can be seen from table 4 above that participants' perception on snacking on sweets, 51.9% of respondents either were not sure or disagreed with snacking on sweets, while 48.1% agreed to snacking on sweets.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, are unsure or disagree to snacking on sweets.

Table 5 shows participants' responses to Factor 4: Cultural/lifestyle behaviours

		Responses		Percent of Cases
		N	Percent	
Lifestyle	Strongly Agree	48	12.0%	48.0%
behaviour	Agree	91	22.8%	91.0%
	Neutral	74	18.5%	74.0%
	Disagree	123	30.8%	123.0%
	Strongly Disagree	64	16.0%	64.0%
Total		400	100.0%	400.0%

It can be seen from table 5 above that participants' perception on their lifestyle behaviour towards eating habits, 65.2% of respondents either were not sure or disagreed with their lifestyle behaviour, while 34.8% agreed with their lifestyle influencing their eating behaviour.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, are unsure or disagree with their lifestyle influencing eating behaviour.

Table 6 shows participants' responses to Factor 5: Haphazard Planning

		Responses		Percent of Cases
		N	Percent	
Planning	Strongly Agree	44	8.8%	44.0%
ahead	Agree	132	26.4%	132.0%
	Neutral	89	17.8%	89.0%
	Disagree	105	21.0%	105.0%
	Strongly Disagree	130	26.0%	130.0%
Total		500	100.0%	500.0%

It can be seen from table 6 above that participants' perception on how they plan for their meals, 64.8% of respondents either were not sure or disagreed with planning their meals, while 35.2% agreed to planning their meals.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, are unsure or disagree to planning their meals.

Table 7 shows participants' responses to Factor 6: Meal Skipping

		Responses		Percent of Cases
		N	Percent	
Meal	Strongly Agree	51	17.0%	51.0%
skipping	Agree	135	45.0%	135.0%
	Neutral	47	15.7%	47.0%
	Disagree	39	13.0%	39.0%
	Strongly Disagree	28	9.3%	28.0%
Total		300	100.0%	300.0%

It can be seen from table 7 above that participants' perception on meal skipping, 62% of respondents agreed to skipping their meals, while 38% were either not sure or disagreed with skipping their meals.

Conclusion: Based on the results, majority of university students with a BMI of 25 or more, agree to skipping their meals.

4.4 Part C

Cross Tabulation

Cross tabulation describes the relationship between two categorical variables. The categories of one variable determine the rows of the table and the categories of the other variable determines the columns. The cells of the table contain the number of time that a combination of categories occurred.

Table 8 shows crosstab of participants that reduce fat in recipes and Gender

		Gender		Total
		Male	Female	
I reduce fat in recipes by substituting ingredients and cutting portions.	Strongly Agree	6	8	14
	Agree	15	18	33
	Neutral	9	19	28
	Disagree	4	10	14
	Strongly Disagree	5	6	11
Total		39	61	100

It can be seen from table 8 above that out of the 100 respondents, 61 were females and 39 were males. A total of 26 females agreed that they reduce fat in recipes by substituting ingredients and cutting proportions. This represents 43% of the total female respondents. Meanwhile, 21 males also agreed, which represents 54% of the male respondents. However, 35 (57%) out of the total females and 18 (46%) out of the total males responded that they do not or are unsure if they reduce fat in their recipes.

Conclusion: Males are more likely to reduce fat in their recipes by substituting ingredients and cutting portions.

Table 9 shows crosstab of participants whose moods affect their eating habits and Gender

		Gender		Total
		Male	Female	
When I am in a bad mood, I eat whatever I feel like eating.	Strongly Agree	7	15	22
	Agree	6	18	24
	Neutral	4	7	11
	Disagree	11	8	19
	Strongly Disagree	11	13	24
Total		39	61	100

It can be seen from table 9 above that out of the 100 respondents, 61 were females and 39 were males. A total of 33 females agreed that when they are in a bad mood, they eat whatever they feel for. This represents 54% of the total female respondents. Meanwhile, 13 males also agreed, which represents 33.3% of the male respondents. However, 28 (46%) out of the total females and 26 (66.7%) out of the total males responded that they do not or are unsure if they eat whatever they feel for when they are in a bad mood.

Conclusion: Females are more likely to eat whatever they feel like eating whenever they are in a bad mood.

Table 10 shows crosstab of participants that snack two to three times daily and Gender

| | | Gender | | |
		Male	Female	Total
I snack two to three times every day.	Strongly Agree	6	6	12
	Agree	13	22	35
	Neutral	4	12	16
	Disagree	12	13	25
	Strongly Disagree	4	8	12
Total		39	61	100

It can be seen from table 10 above that out of the 100 respondents, 61 were females and 39 were males. A total of 28 females agreed that they snack two to three times daily. This represents 46% of the total female respondents. Meanwhile, 19 males also agreed, which represents 49% of the male respondents. However, 33 (54%) out of the total females and 20 (51%) out of the total males responded that they do not or are unsure if they snack two to three times daily.

Conclusion: Males are more likely to snack two to three times every day.

Table 11 shows crosstab of participants that plan meals ahead and Gender

		Gender		Total
		Male	Female	
I take time to plan meals for the coming week.	Strongly Agree	0	4	4
	Agree	4	4	8
	Neutral	5	13	18
	Disagree	15	25	40
	Strongly Disagree	15	15	30
Total		39	61	100

It can be seen from table 11 above that out of the 100 respondents, 61 were females and 39 were males. A total of 53 females responded that they do not or are unsure if they take time to plan meals for coming weeks. This represents 87% of the total female respondents. Meanwhile, 35 males also agreed, which represents 90% of the male respondents. However, 8 (13%) out of the total females and 4 (10%) out of the total males agreed that they take time to plan meals for coming weeks.

Conclusion: Majority of university students do not take time to do meal planning and in the case that they do, females are more likely to plan their meals than males.

Table 12 shows crosstab of participants that rather buy take-out than cooking and Gender

| | | Gender | | |
		Male	Female	Total
I would rather buy takeout food and bring it home than cook.	Strongly Agree	5	7	12
	Agree	13	15	28
	Neutral	5	13	18
	Disagree	6	11	17
	Strongly Disagree	10	15	25
Total		39	61	100

It can be seen from table 12 above that out of the 100 respondents, 61 were females and 39 were males. A total of 22 females agreed that they would rather buy take-out and bring home than cooking. This represents 36% of the total female respondents. Meanwhile, 18 males also agreed, which represents 46% of the male respondents. However, 39 (64%) out of the total females and 21 (54%) out of the total males responded that they would not or are unsure if they would rather buy take-out and bring home than cooking.

Conclusion: Males are more likely to buy take-out food and bring it home rather than cooking.

Table 13 shows crosstab of participants that will skip a meal even if it's time to eat and Gender

| | | Gender | | |
		Male	Female	Total
If I do not feel hungry, I will skip a meal even if it is time to eat.	Strongly Agree	6	16	22
	Agree	22	28	50
	Neutral	5	10	15
	Disagree	3	3	6
	Strongly Disagree	3	4	7
Total		39	61	100

It can be seen from table 13 above that out of the 100 respondents, 61 were females and 39 were males. A total of 44 females agreed that they if they do not feel hungry, they will skip a meal even if it's time to eat. This represents 72% of the total female respondents. Meanwhile, 28 males also agreed, which represents 72% of the male respondents. However, 17 (28%) out of the total females and 11 (28%) out of the total males responded that they would not or are unsure if they would skip a meal if they do not feel hungry, even if it's time to eat.

Conclusion: The likelihood of persons to skip a meal if they do not feel hungry, even if it's time to eat, is equal for both males and females.

Table 14 shows crosstab of participants that reduce fat in recipes and Age

		Age				
		18-30	31-40	41-50	51 and over	Total
I reduce fat in recipes by substituting ingredients and cutting portions.	Strongly Agree	9	1	4	0	14
	Agree	17	4	9	3	33
	Neutral	24	1	3	0	28
	Disagree	13	1	0	0	14
	Strongly Disagree	7	2	2	0	11
Total		70	9	18	3	100

It can be seen from table 14 above that out of the 100 participants, 44 participants, or 44% of participants between the ages of 18-30 are either not sure or disagreed to reducing fat in recipes. In addition, 4% and 5% of the participants between the ages of 31-40 and 41-50 respectively, are either not sure or disagreed to reducing fat in recipe. However, 26 persons between the ages of 18-30 agree to reducing fat in recipes, which represents 26% of the total participants. Approximately, 5%, 13% and 3% of participants between the ages of 31-40, 41-50, and 51 and over respectively agreed that they reduce fat in recipes.

Conclusion: University students between ages of 18-30 were mostly not sure or disagreed to reducing fat in recipes by substituting ingredients and cutting portions.

Table 15 shows crosstab of participants whose moods affect their eating habits and Age

		Age				Total
		18-30	31-40	41-50	51 and over	
When I am in a bad mood, I eat whatever I feel like eating.	Strongly Agree	17	3	2	0	22
	Agree	14	3	6	1	24
	Neutral	8	1	1	1	11
	Disagree	16	1	1	1	19
	Strongly Disagree	15	1	8	0	24
Total		70	9	18	3	100

It can be seen from table 15 above that out of the 100 participants, 39 participants, or 39% of participants between the ages of 18-30 are either not sure or disagreed to eating whatever they want when they are in a bad mood. In addition, 3% ,10%, and 2% of the participants between the ages of 31-40, 41-50, and 51 and over respectively, either not sure or disagreed to eating whatever they want when they are in a bad mood. However, 31 persons between the ages of 18-30 agree to reducing fat in recipes, which represents 31% of the total participants. Approximately, 6%, 8% and 1% of participants between the ages of 31-40, 41-50, and 51 and over respectively agreed to eating whatever they want when they are in a bad mood.

Conclusion: University students between ages of 18-30 were mostly not sure or disagreed to eating whatever they want when they are in a bad mood.

Table 16 shows crosstab of participants that snack two to three times daily and Age

		Age				
		18-30	31-40	41-50	51 and over	Total
I snack two to three times every day.	Strongly Agree	9	2	1	0	12
	Agree	24	4	7	0	35
	Neutral	11	3	2	0	16
	Disagree	19	0	4	2	25
	Strongly Disagree	7	0	4	1	12
Total		70	9	18	3	100

It can be seen from table 16 above that out of the 100 participants, 37 participants, or 37% of participants between the ages of 18-30 are either not sure or disagreed to snacking two to three times every day. In addition, 3% ,10%, and 3% of the participants between the ages of 31-40, 41-50, and 51 and over respectively, are either not sure or disagreed to snacking two to three times every day. However, 33 persons between the ages of 18-30 agree to reducing fat in recipes, which represents 33% of the total participants. Approximately, 6% and 8% of participants between the ages of 31-40 and 41-50 respectively agreed to snacking two to three times every day. No participant between the ages of 51 and over agreed to snacking two to three times every day.

Conclusion: University students between ages of 18-30 were mostly not sure or disagreed to snacking two to three times every day

Table 17 shows crosstab of participants that plan meals ahead week and Age

		Age				
		18-30	31-40	41-50	51 and over	Total
I take time to plan meals for the coming week.	Strongly Agree	3	0	1	0	4
	Agree	6	0	2	0	8
	Neutral	9	3	4	2	18
	Disagree	31	4	5	0	40
	Strongly Disagree	21	2	6	1	30
Total		70	9	18	3	100

It can be seen from table 17 above that out of the 100 participants, 61 participants, or 61% of participants between the ages of 18-30 are either not sure or disagreed to taking time to plan meals for the coming week. In addition, 9% ,15%, and 3% of the participants between the ages of 31-40, 41-50, and 51 and over respectively, are either not sure or disagreed to taking time to plan meals for the coming week. However, 12 persons between the ages of 18-30 agree to taking time to plan meals for the coming week, which represents 12% of the total participants. Approximately, 3% of participants between the ages of 41-50 agreed to snacking two to three times every day. However, no participant between the ages of 31-40 and 51 and over agreed to taking time to plan meals for the coming week.

Conclusion: University students between ages of 18-30 were mostly not sure or disagreed to taking time to plan meals for the coming week.

Table 18 shows crosstab of participants that would rather buy take out than cooking and Age

		Age				Total
		18-30	31-40	41-50	51 and over	
I would rather buy takeout food and bring it home than cook.	Strongly Agree	11	0	1	0	12
	Agree	20	4	3	1	28
	Neutral	13	3	0	2	18
	Disagree	13	2	2	0	17
	Strongly Disagree	13	0	12	0	25
Total		70	9	18	3	100

It can be seen from table 18 above that out of the 100 participants, 39 participants, or 39% of participants between the ages of 18-30 are either not sure or disagreed to rather buying take out than cook at home. In addition, 5% ,14%, and 2% of the participants between the ages of 31-40, 41-50, and 51 and over respectively, are either not sure or disagreed to rather buying take-out than cook at home. However, 31 persons between the ages of 18-30 agree to rather buying take-out than cook at home, which represents 31% of the total participants. Approximately, 4% ,4% and 1% of participants between the ages of 31-40, 41-50 and 51 and over respectively agreed to rather buying take-out than cook at home.

Conclusion: University students between ages of 18-30 were mostly not sure or disagreed to rather buying take-out than cook at home.

Table 19 shows crosstab of participants that will skip a meal even if it's time to eat and Age

		Age				
		18-30	31-40	41-50	51 and over	Total
If I do not feel hungry, I will skip a meal even if it is time to eat.	Strongly Agree	16	2	4	0	22
	Agree	35	3	9	3	50
	Neutral	11	3	1	0	15
	Disagree	4	0	2	0	6
	Strongly Disagree	4	1	2	0	7
Total		70	9	18	3	100

It can be seen from table 19 above that out of the 100 participants, 51 persons between the ages of 18-30 agree to skipping a meal even if it's time to eat, which represents 51% of the total participants. Approximately, 5% ,13% and 3% of participants between the ages of 31-40, 41-50 and 51 and over respectively agreed to skipping a meal even if it's time to eat.

However, 19 participants, or 19% of participants between the ages of 18-30 are either not sure or disagreed to skipping a meal even if it's time to eat. In addition, 4% and 5% of the participants between the ages of 31-40 and 41-50 respectively, are either not sure or disagreed to skipping a meal even if it's time to eat. No participant between the ages of 51 and over agreed to skipping a meal even if it's time to eat.

Conclusion: Participants between ages of 18-30 mostly agreed to skipping a meal even if it's time to eat.

4.5 Part D

Comparison of baseline BMI and post intervention mean within the Healthy Start (experiment) group and control group.

Paired Samples T-test

A paired sample t test is used to evaluate whether a statistically significant difference existed between the mean BMI of participants before and after the experiment period. A significance level of (0.05) was used.

Table 20 shows the paired sample statistics of the experiment group and control group

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-BMI (Ex)	29.1853	45	3.95445	.58949
	Post-BMI(Ex)	29.0143	45	4.08969	.60966
Pair 2	Pre-BMI (Control)	26.2072	42	1.02767	.15857
	Post-BMI (Control)	26.3052	42	1.30139	.20081

It can be seen from table 4.0 above that Pair 1 is the BMI for the experiment group (Healthy Start) before and after the experiment. The baseline BMI mean was at 29.18 for 45 participants, and post experiment mean was 29.01, which represents 0.17 decrease in BMI.

However, Pair 2 is the BMI for the control group before and after the experiment. The baseline BMI mean was at 26.21 for 42 participants, and post experiment mean was 26.30, which represents 0.09 increase in BMI.

Conclusion: Although there was a 10% and 16% attrition rate in the experiment and control group respectively, it can be concluded based on the mean BMI recorded for both groups that the

healthy start group had a slight decrease in mean BMI of participants, while the control group

showed a slight increase in mean BMI.

Table 21 shows the paired samples test of the experimental group and control group

Paired Samples Test

							t	df	Sig. (2-tailed)
		Paired Differences							
		Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
					Lower	**Upper**			
Pair 1	Pre-BMI (Ex) - Post-BMI(Ex)	.17102	.70449	.10502	-.04064	.38267	1.628	44	.111
Pair 2	Pre-BMI (Control) - Post-BMI (Control)	-.09805	.50876	.07850	-.25659	.06050	-1.249	41	.219

Table 4.1 above shows the mean difference between the means of both the Healthy Start

group and the control group. The Healthy Start Group had a BMI mean difference of 0.17

(decrease), while the control group BMI mean difference was -0.09 (increase). Based on the

significant figures 0.111 and 0.219 the researchers can conclude that there is no statistically

significant difference between means, because both significant figures are greater than the

significance level of (0.05). These results suggest that the web portal had no significant effect on

the BMI of participants. Similar to the "ObeseGo!" research done, the Healthy Start web portal

had little effect on the participants BMI. However, there was a difference in that, the "ObeseGo!"

results were statistically significant and Healthy Start results are not.

4.6 Discussion

A total of 100 participants were included in the study. All 100 participants completed the questionnaires, 50 persons each were assigned to the Healthy Start (experiment) and control group. 61% of the participants were females and 39% males. At the end of the study, the experiment group had an attrition rate of 10% (5 participants dropped out), while the control group had an attrition rate of 16% (8 participants dropped out).

Firstly, in regard to research sub question 1, the eating behaviours associated with students who are overweight/obese, questions from six (6) sections of the questionnaire were used in this section. In table 2.0, 61.3% of university students with a BMI of 25 or more, are unsure or disagree to low-fat eating. In table 2.1, 67.3% of participants are unsure or disagree they eat based on their emotions. Majority of the participants (64.8%) are not sure or disagree to planning their meals, seen in table 2.4. An alarming 62% of participants agreed to skipping meals, seen in table 2.5.

Secondly, in regard to research sub question 2, the extent that participants utilize the internet intervention, the Healthy Start (experiment) group suffered a 10% attrition rate. Five weekly topics were posted on the web portal and individuals were encouraged to log in weekly. An average of 4 logins were recorded over the period, 80% of weekly topics were completed.

Finally, in regard to research sub question 3, the effect that the web portal has on the BMI of students, it could be seen in table 4.0 that there was a 10% and 16% attrition rate in the experiment and control group respectively. It can be concluded based on the mean BMI recorded for both groups that the healthy start group had a slight decrease in mean BMI difference (0.17), while the control group showed a slight increase in mean BMI difference (-0.09). However, in table 4.1, based on the significant figures 0.111 and 0.219 the researchers can conclude that there

is no statistically significant difference between means, because both significant figures are greater than the significance level of (0.05). The web portal had no effect on the BMI of students.

The Healthy Start intervention showed a small effect in controlling and reducing overweight and obesity compared to the health education via a pamphlet. As the researchers hypothesised, the respondents in the Healthy Start group had minimally reduced BMI in contrast to that in the control group. This suggests that the Healthy Start portal provides effective health education to the sample population. The portal, which consisted of obesity information, diet information, weekly activities and other related information, created awareness among the respondents regarding practicing and living a healthier lifestyle. This interactive web-based module had a good impact on respondents who showed their commitment toward reducing their weight. Even though the intervention effect was small, it showed that technology played an important role in delivering the message compared to the routine pamphlets.

Chapter 5: Summary, Conclusions & Recommendations

5.1 Summary

This research was based on a quantitative research approach where the quasi-experimental design (pretest-posttest design) was applied. The aim of this study was to measure if university students' body mass index (BMI) will; improve, decline or remain stagnant with the implementation of a web portal to provide information about a healthy lifestyle. Obesity is on the rise in Jamaica, and one in two individuals have obesity in the country (Jamaica Health and Lifestyle Survey III, 2018). The research questions for the study are listed below:

What is the extent to which an online portal can assist in reducing the level of obesity in Jamaican university students?

Sub-questions:

1. What eating behaviours are associated with students who are overweight/obese?

2. To what extent do participants utilize the internet intervention?

3. What effect the web portal has on the BMI of students?

The objectives of the research are; to identify contributing factors to obesity among students of the University of Technology, Jamaica, and to educate the students about the dietary and lifestyle measures needed to prevent obesity.

Finally, the procedures undertaken by the researches was to have interviews and record BMI of participants (baseline). Afterwards, questionnaires were issued, and participants were divided into two groups; Group A (experiment) and Group B (control) group. The experiment group had access to the Healthy Start web portal while the control group received printed

versions of the information on the website. After the experiment, the post experiment BMI was measured and compared to the baseline BMI.

5.2 Conclusions

This research investigated the use of a web portal to reduce the levels of obesity in university students. The problem of obesity in Jamaica needs to be eliminated. It can, however, it will take time, money, and a combined effort from the government and citizens.

Firstly, in regard to research sub question 1, the Eating Behavior Questionnaire (EBQ) was effective in finding out the eating behaviours associated with students who are overweight/obese; majority of university students are not sure or don't practice low-fat eating and planning their meals. In addition, majority of students agreed to skipping their meals. Thus, these factors contribute significantly to the weight of university students at UTECH. However, these findings cannot be generalized to other university students. The same study needs to be conducted with students from other universities to see if there are any similarities with the eating behaviours that are associated with a BMI of 25 kg/m or more (overweight).

Secondly, in regard to research sub question 2, the extent that participants utilize the internet intervention, the Healthy Start web portal showed a high level of usage. User login was tracked along with the total amount of weekly topics completed. An average of 4 logins were recorded over the period, 80% of weekly topics were completed. Hence, the Healthy Start web portal was an innovate medium to deliver healthy information to students and showed a high participation rate.

Finally, in regard to research sub question 3, the effect that the web portal has on the BMI of students. It can be concluded, that based on the mean BMI recorded for both groups, the

healthy start group had a slight decrease in mean BMI difference (slight weight loss), while the

control group showed a slight increase in mean BMI difference (slight weight gain). However,

based on the significant figures recorded in the paired samples test table, the researchers can

conclude that there is no statistically significant difference between means, because both

significant figures are greater than the significance level of (0.05). These results suggest that the

web portal had no significant effect on the BMI of participants. Similar to the "ObeseGo!"

research done, the Healthy Start web portal had little effect on the participants BMI. However,

there was a difference in that, the "ObeseGo!" results were statistically significant and Healthy

Start results are not.

5.3 Recommendations

Based on the findings and conclusion of the study, here are a few recommendations to be

considered:

1. The cooperation of the students in doing the weekly activities should be increased so that
   a proper analysis of the portal's effect can be done.
2. Students should change their attitudes towards healthy food options and maintaining a
   healthy lifestyle.
3. Since the main reason for not doing meal planning is related to the purchasing of fast
   food due to convenience, more healthy food options should be provided on campus.
4. Compulsory courses on healthy eating and maintaining a healthy lifestyle should be
   offered in schools.

Recommendations for Future Research

      Since this study had only focused on students of the University of Technology, Jamaica, it is recommended that further studies be carried out on students from other universities to see whether there are any similarities in the findings. This research could also be conducted on other population and not just university students only. Furthermore, this experiment lasted over a span of only 5 weeks, so a longer experiment period is recommended to get more significant results. Lastly, a mobile version of the web portal could be created in future research since the use of mobile technology is constantly growing.

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Appendices

Appendix A: Sample Questionnaire for Participants

The purpose of this study is to investigate the willingness of university students to utilize an online portal to gain information on nutritive food solutions in order to help reduce the level of obesity in Jamaica. The study is being conducted through the University of Technology and since you are currently a student of the institution, you are invited to participate in this research by completing the attached questionnaire.

Participation in this study is not mandatory and if at any time you feel the need to withdraw from the study, you may do so freely. The questionnaire consists of twenty-six (26) questions and will require approximately 15 minutes to complete. There is no compensation for responding nor are there any known risks and in order to ensure confidentiality, the survey does not require your name. If you choose to participate in this research, please answer all questions honestly and return the completed questionnaire back to the researcher.

Thank you for taking the time to assist us in our study. Your answers will provide valuable information that will aid in the development and determining the usefulness of the web portal. Please note that the completion and return of the questionnaire will indicate your willingness to participate. If you require additional information or have any questions, please feel free to contact Mr. Clayton Peterkin, the project leader, at (876) XXX-XX08.

Demographics, 2 items

1. What gender are you?
   ☐ Male
   ☐ Female

2. Which age group do you belong?
   ☐ 18-30
   ☐ 31-40
   ☐ 41-50
   ☐ 51 and over

Factor 1: Low-fat eating, 4 items

3. I reduce fat in recipes by substituting ingredients and cutting portions.
   ☐ Strongly Disagree
   ☐ Disagree
   ☐ Neutral or Not Applicable
   ☐ Agree
   ☐ Strongly Agree

4. I am very conscious of how much fat is in the food I eat.
   ☐ Strongly Disagree,
   ☐ Disagree,
   ☐ Neutral or Not Applicable,
   ☐ Agree,
   ☐ Strongly Agree

5. I use low-fat food products.
   ☐ Strongly Disagree
   ☐ Disagree
   ☐ Neutral or Not Applicable
   ☐ Agree
   ☐ Strongly Agree

6. I choose healthy foods to prevent heart disease.
   ☐ Strongly Disagree
   ☐ Disagree
   ☐ Neutral or Not Applicable
   ☐ Agree
   ☐ Strongly Agree

Factor 2: Emotional eating, 4 items

7. When I am in a bad mood, I eat whatever I feel like eating.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

8. I eat for comfort.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

9. My emotions affect what and how much I eat.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

10. I snack more at night.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

Factor 3: Snacking on sweets, 4 items

11. Sometimes I eat dessert more than once a day.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

12. I have a sweet tooth.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable

☐ Agree
☐ Strongly Agree

13. I eat cookies, candy bars, or ice cream in place of dinner.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

14. I snack two to three times every day.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

Factor 4: Cultural/lifestyle behaviours, 4 items

15. On Sunday, I eat a large meal with my family.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

16. I buy meat every time I go to the grocery store.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

17. I have a serving of meat at every meal.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

18. I take time to plan meals for the coming week.
☐ Strongly Disagree

☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

Factor 5: Haphazard planning, 5 items

19. I would rather buy takeout food and bring it home than cook.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

20. I eat out because it is more convenient than eating at home.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

21. I stop for a fast food breakfast on the way to school.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

22. When I don't plan meals, I eat fast food.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

23. I eat at a fast food restaurant at least three times a week.
☐ Strongly Disagree
☐ Disagree
☐ Neutral or Not Applicable
☐ Agree
☐ Strongly Agree

Factor 6: Meal skipping, 3 items

24. If I do not feel hungry, I will skip a meal even if it is time to eat.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree
25. If I eat a larger than usual lunch, I will skip supper.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

26. If I am busy, I will eat a snack instead of lunch.
    ☐ Strongly Disagree
    ☐ Disagree
    ☐ Neutral or Not Applicable
    ☐ Agree
    ☐ Strongly Agree

Appendix B: Minutes for Major Project Meeting January 11, 2019

Location: Conference Room (SCIT)

Time: 12:50 pm

Attendees: Derrick Logan

                Toni Parr

                Clayton Peterkin

Agenda

- Apologies for absence from K-Leann Daubon

- No minutes from previous meeting read.

- **Introduction:**

    ➢ Reword the research problem

    ➢ Research problem needs to be more focused

- **Literature Review:**

    ➢ Include previous research on the topic by previous researchers

    ➢ Are there other ways people have tried and what have the results been?

    ➢ Remove the use of fruits subtopic from Lit Review

    ➢ Include technologies where there has been no reduction in participants' weight

- **Experiment design:**

- Consider involving monitoring the weight

- Motivational messages/notifications sent daily to participants to ensure they continue

- Sample selection:

    ➢ Convenience sampling

- Fill out ethics form on moodle

- Check journal paper for previous questionnaires

- Read up on a suitable time frame for the experiment to be conducted

Appendix C: Minutes for Major Project Meeting February 13, 2019

Location: Conference Room (SCIT)

Time: 2:00 pm

Attendees: Derrick Logan

                 K-Leann Daubon

                 Clayton Peterkin

Agenda

- Apologies for absence from Toni Parr

- Try to find a more positive name for the website. The word 'obese' makes it too negative. For example, 'Let's Get Slimmer!' or get opinions from other persons.

- Keep track of how often persons go on the site(statistics) and what pages they generally visit.

- Google Analytics can be used to gather statistics from the site.

- DYNDNS/Amazon Web Services (about $14/month) can be used to host the site.

- Give motivational quotes on website for encouragement.

- Record the number of persons who actually stayed on program.

- Next Meeting Date:

  ➢ Thursday, February 21, 2019 with Mr. Logan

Appendix D: Minutes for Major Project Meeting March 14, 2019

Location: Conference Room (SCIT)

Time: 2:10 pm

Attendees: Derrick Logan

                 K-Leann Daubon

                 Toni Parr

                 Clayton Peterkin

                 Rayvon Stewart

Agenda

- Apologies for absence from Lajuane Wallace

- - Make note of how many people don't want to participate and why

- - Web app is ready.

- - Change from "Topic" to "Week".

- - Last sign in date - to see if people are consistent.

- - May need to start analysing info as soon as we hit 100 people.

- - Consider an incentive for the person who is most active.

- Hosting options

     o DYNDNS (US$25/year

     o AMAZON

Appendix E: User Manual

V.1.0.0

Healthy
Start

USER MANUAL

May 2019

Version & Release Information

Version Number: 1.0.0

Year: 2019

Organization of Manual:

The user's manual consists of eight (8) sections: General Introduction, System Overview, Minimum System Requirements, Installation Instructions, System Configuration, User Access Levels, Contingencies and Illustrated Walkthrough. General Information section explains in general terms the system and the purpose for which it is intended. The System Overview section provides an insight into capabilities of the system. The Minimum System Requirement provides an outline of the recommended specifications in order to efficiently navigate the system. The Installation instructions and System configuration states the platform in which the system would be compatible with and determine whether or not installation is needed. The User Access level explains the different users who interact with the system. The contingencies and Illustrated Walkthrough section state the behaviour system in the case of any contingencies and how a user may be able to easily navigate the system.

General Introduction:

The purpose of this web application is to investigate the willingness of university students to utilize an online portal to gain information on nutritive food solutions in order to help reduce the level of obesity in Jamaica. This web application uses an intuitive user interface that raises awareness towards the users/ participants about obesity. This online portal also provides a graphical user interface that allows a user to give feedback so that administrators are able to provide a more effective and efficient service.

System Overview:

As a User of the Web portal application, you shall be able to create your account, after which

you can login and get started. Users will be able to view the different weekly topics, state what

he/she has learnt from each topic and also leave comments in order to improve the system.

Minimum System Requirements:

- Operating System (Windows XP, SP 2)

- Processor Speed (Celeron 750 Mhz, Pentium 1.0 GHz or AMD 1.0 GHz)

- Memory, RAM (256 MB)

- Graphics Card (128 MB video memory)

o Preferred System Hardware Requirements

- Operating System (Windows Vista, 7, 8.1 or 10)

- Processor Speed (Centrino - Pentium M 2 GHz, Core [Duo/Solo] 2.5 GHz or AMD 3.1

  GHz)

- Memory, RAM (2 GB)

- Graphics Card (256 MB video memory)

Installation Instructions:

- This program does not require an installation. It is a fully functional website that is

  available at any time convenient to the user. The web site can be found at

  http://healthystart.000webhostapp.com/index.php

System Configuration:

Health Start Web portal operates on web platform or browser on a computer with a Windows 8 or iOS operating system. Performance may vary depending on the operating system used, however it is recommended to use higher versions of Windows for optimal performance. The web application requires connection to Internet in order to save data to database and data saved in database can be seen using any major Internet browser.

User Access Levels:

- User/Participants

  o As a User/Participant, you will be able to create an account on the web portal, login, and participate in the different weekly activities.

- Admin

  o As an Administrator, you will be able to view all data entered such as feedbacks given from users, account details and the current participants of the application.

Contingencies:

In case of power outage or lack of internet connectivity data will not be saved within the database.

Illustrated Walkthrough

Getting Started:

1. Open your favourite Web browser (e.g. Google Chrome or Mozilla Firefox) and enter the

URL for the website: http://healthystart.000webhostapp.com/index.php
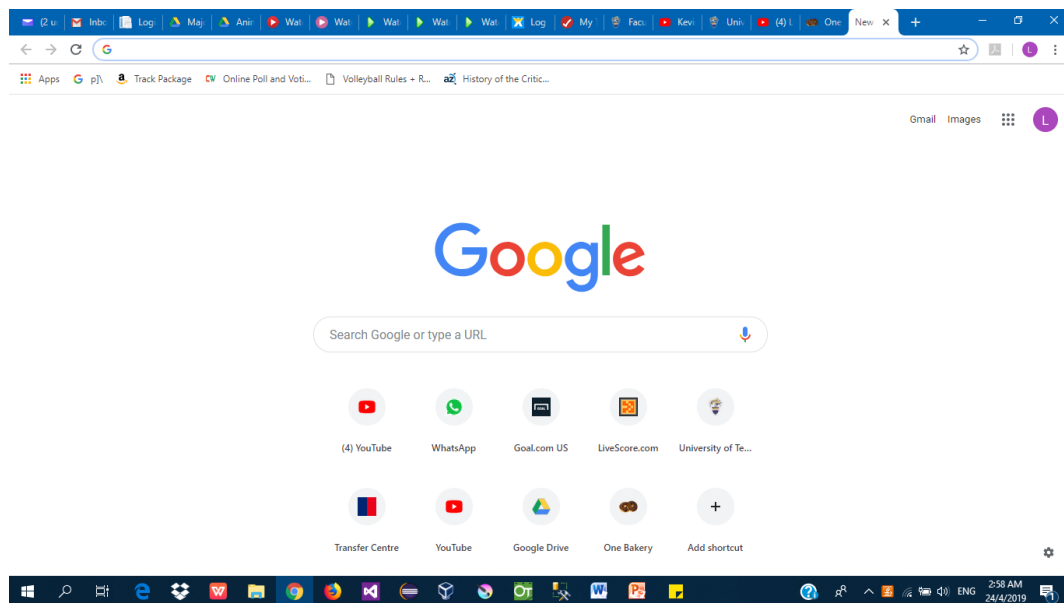
Figure 2. Screenshot showing browser homepage

2. Upon entering the URL address, the web portal should appear. See screen below.
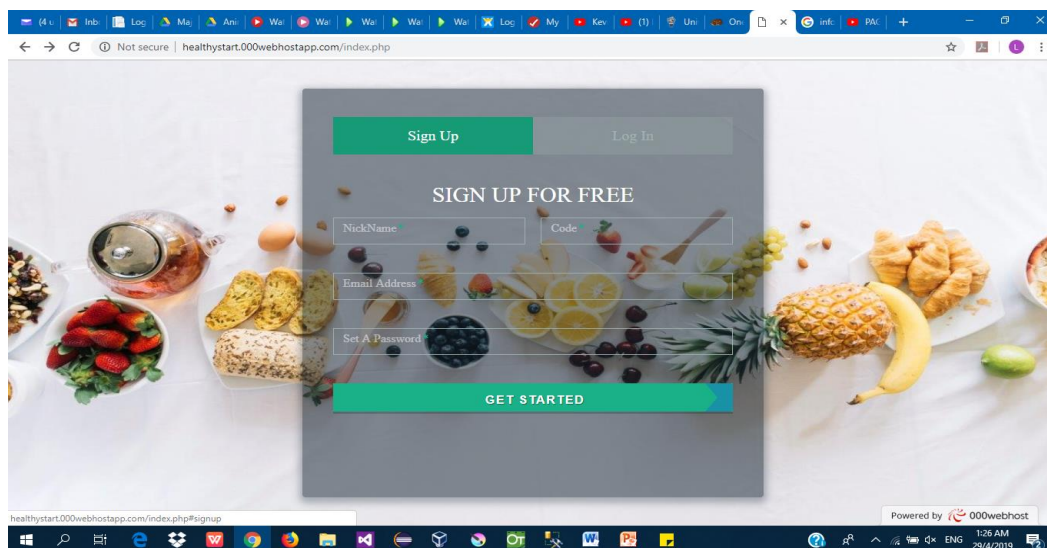
Figure 3. Screenshot showing Healthy Start landing page

3. Users can then either select "Sign up" (for first time participants) or "login", see screen

below.
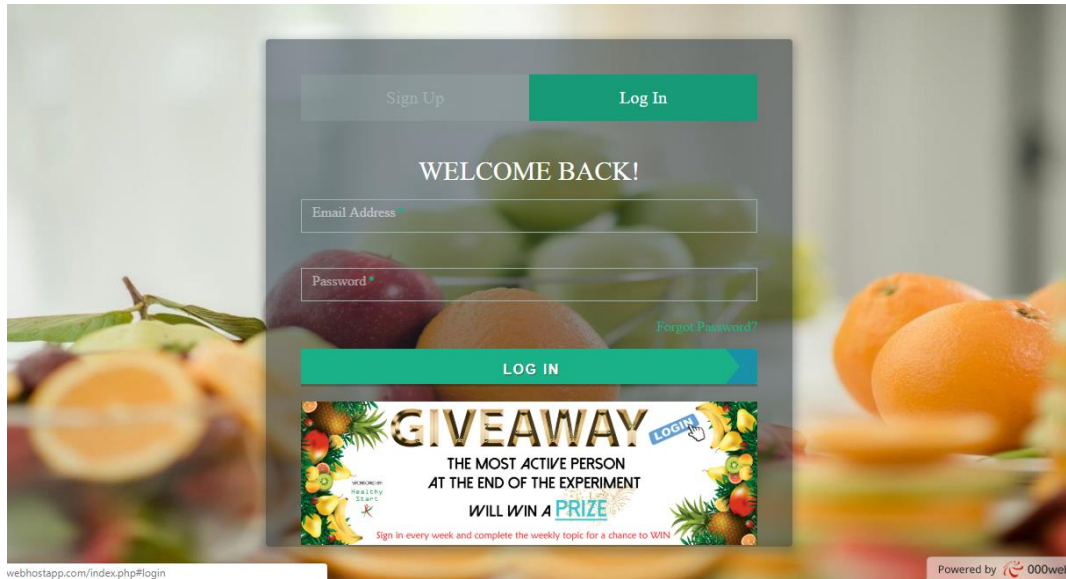
Figure 4. Screenshot showing Log In page

4. When participants are signing up, they enter the verification code **123xyz** along with the

rest of the required information.
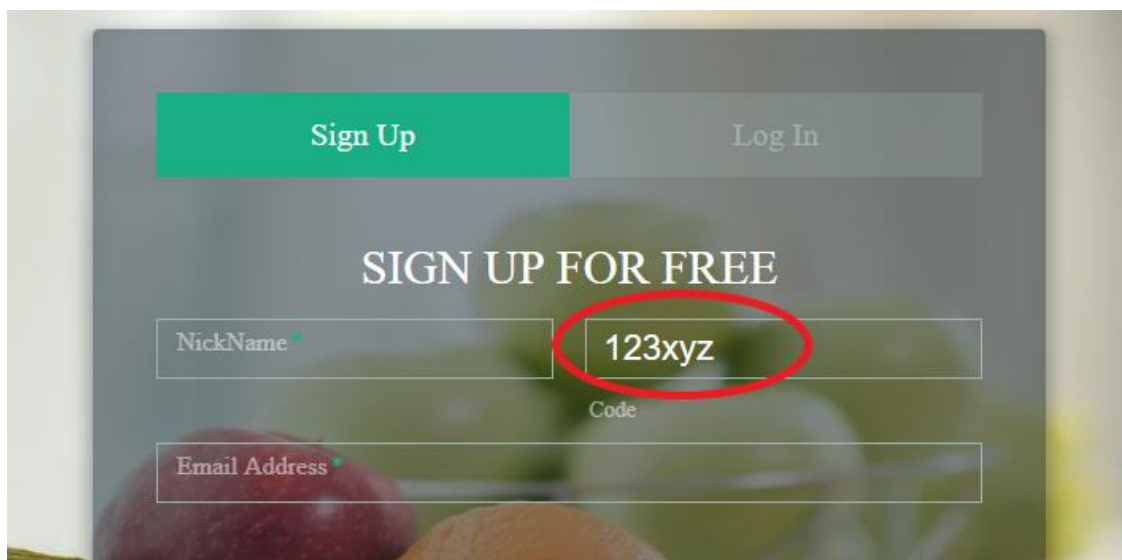
Figure 5. Screenshot shows the verification code for authorized users

5. If an incorrect Username or Password is entered while logging in then an error message will appear, see screen below.

Figure 6. Screenshot showing error handling for incorrect credentials

6. After a logging in with the correct information, the screen below will appear. A pop-up message will appear before going onto the home page, see screens below.
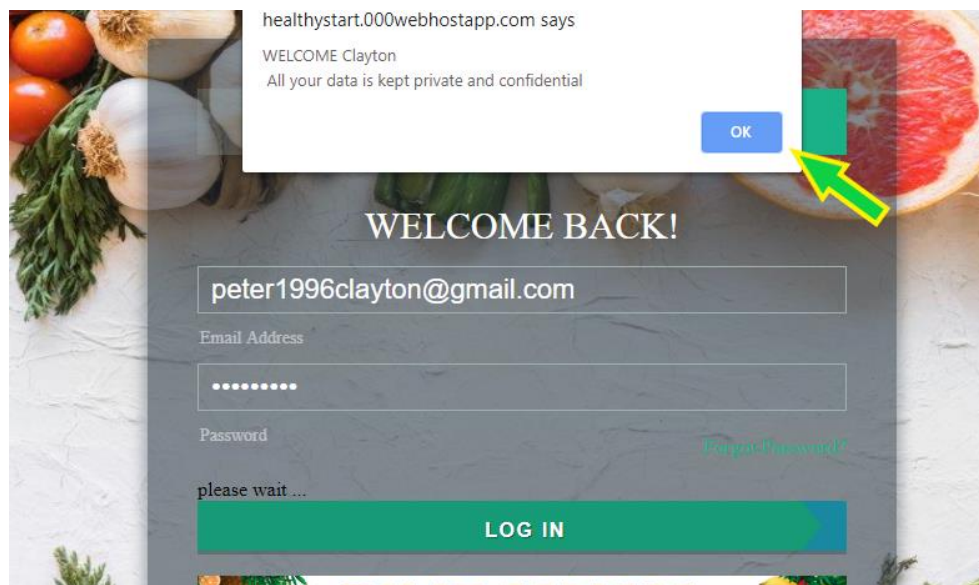
Figure 7. Screenshot showing pop-up indicating successful login

7. After a successful login, the screen below will appear depicting the Home Page of the portal. The Home page consists of the weekly topics, a progress bar and other menu options.
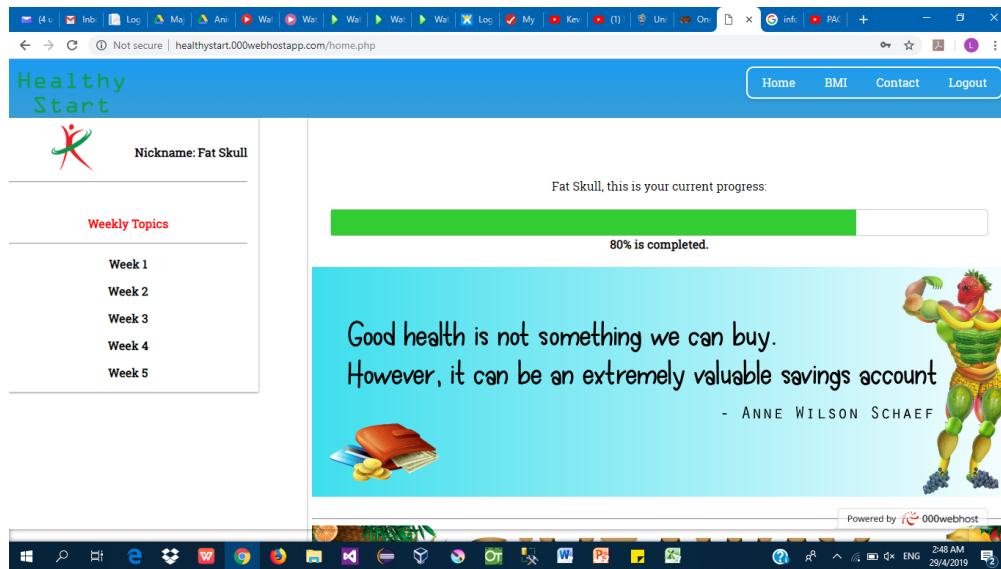
Figure 8. Screenshot showing the home screen

8. Upon selecting a "Weekly Topic", the User/Participant will be able to view what information is entailed for that week. See screen below.
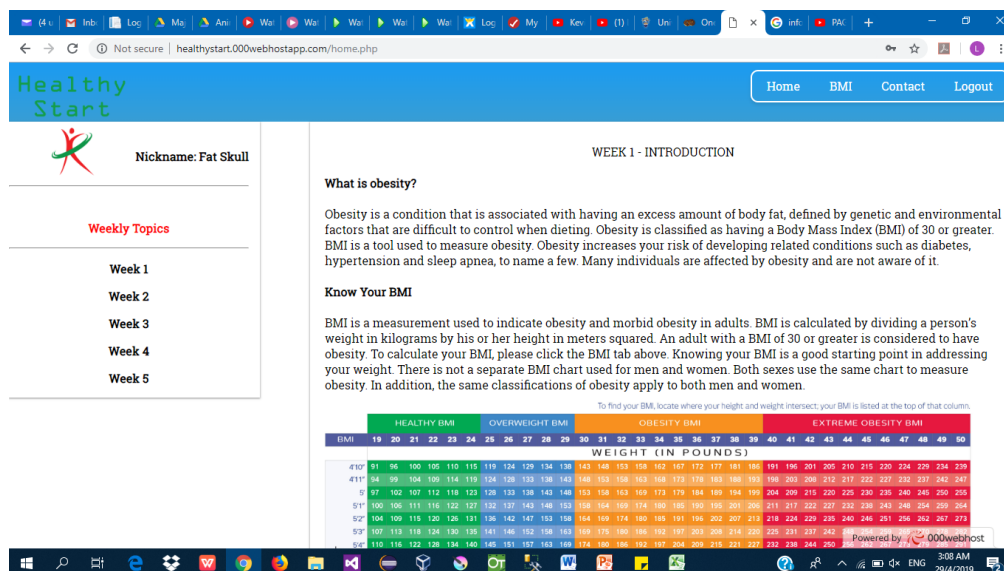
Figure 9. Screenshot showing one of the weekly topics

9. After completing a weekly topic, the user will be able to complete the week by selecting

    "Finish Week", see screen below.
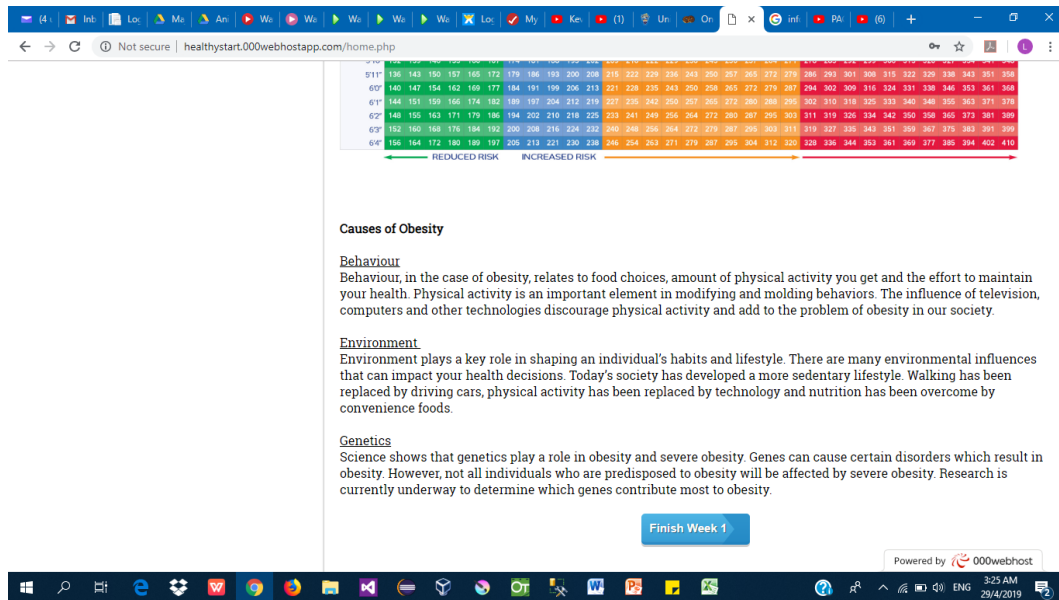
Figure 10. Screenshot showing the "Finish Week" option at the end of the weekly activity

10. After completing a weekly topic, the user is kindly asked to state what they have learnt

    and give feedback as to how to make the service given much better. See screen below.
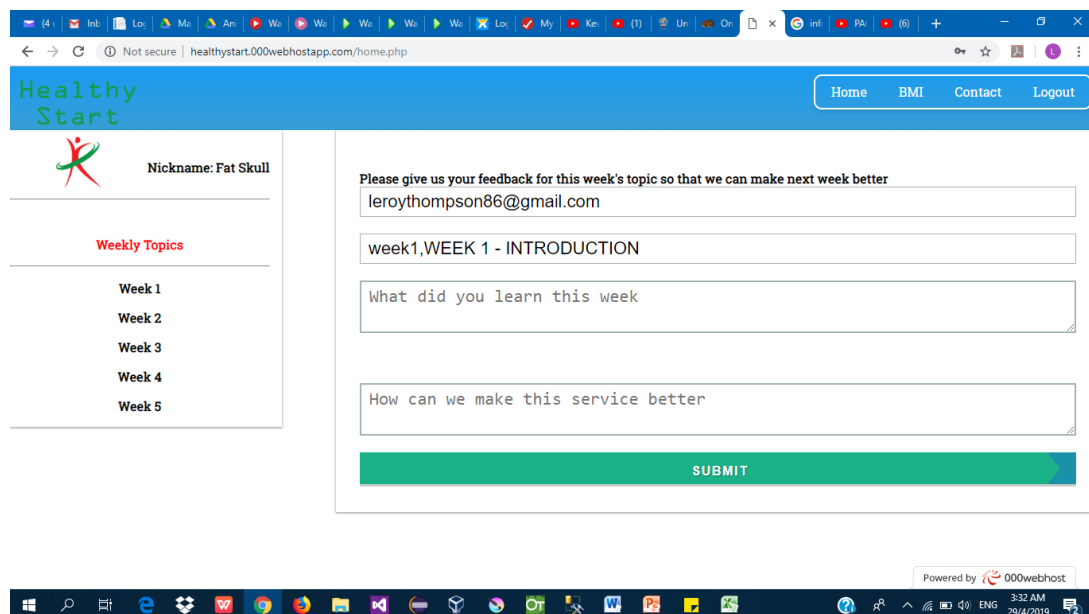
Figure 11. Screenshot showing the webpage that asks for the user's feedback

11. Upon entering the information, the user will then select "submit" to update his/her current

progress.

Figure 12. Screenshot showing completed boxes for submission

12. A pop-up message will appear to inform the user that all data will be kept private and

confidential and that the information given has been successfully submitted. See next two

(2) screens below.

Figure 13. Screenshot shows pop-up displayed to inform user that their information is secure

Figure 14. Screenshot showing that the user's information was successfully submitted
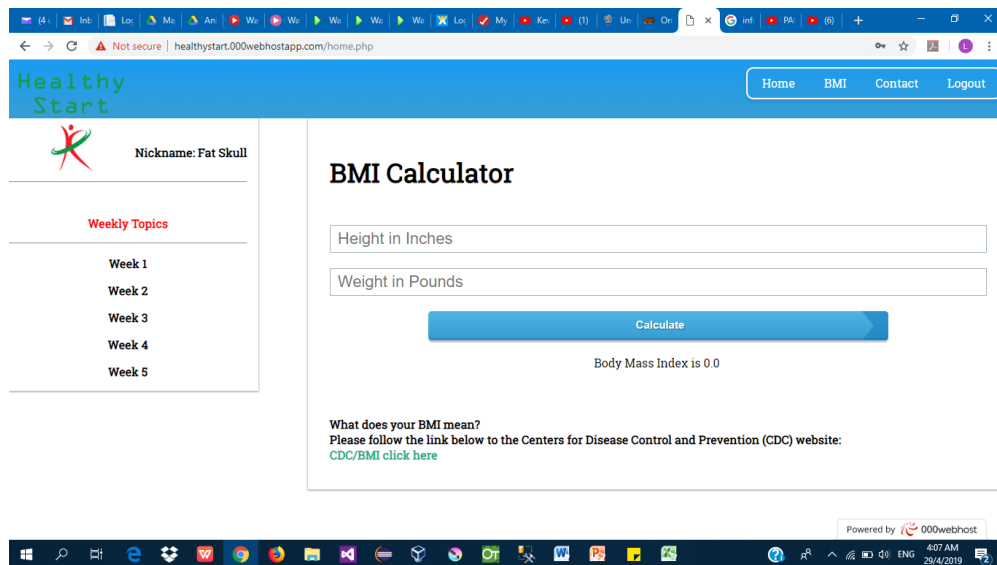
13. The user can then return to the home screen by selecting "Home" to view the updated progress bar. See screen below.

Figure 15. Screenshot showing that the user has completed all the weekly activities
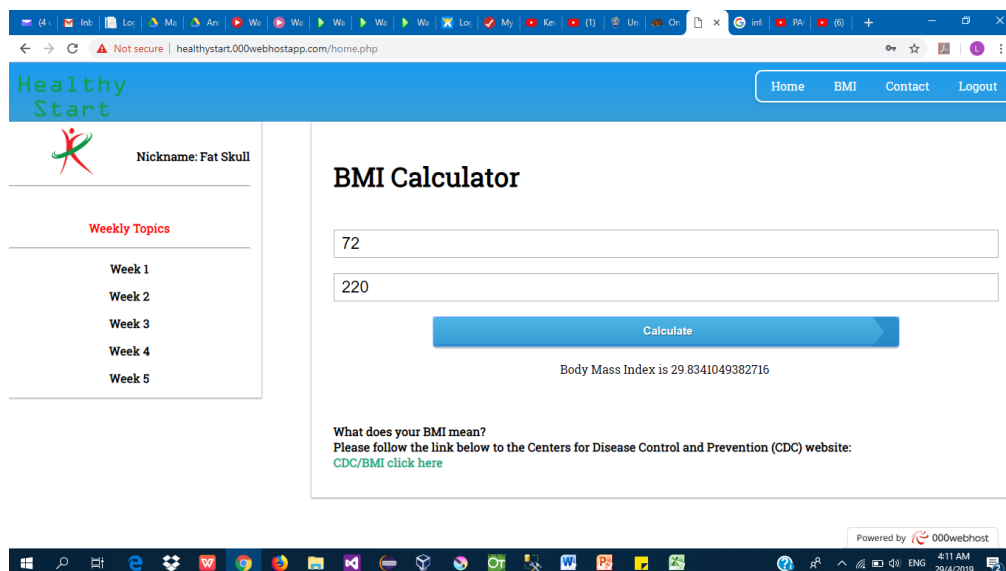
14. User can also select "BMI" on the menu tab to calculate his/her BMI index, see screen below.

Figure 16. Screenshot showing the BMI calculator tab on the website

15. Upon entering your "Height" (in Inches) and your "Weight" (in pounds), then selecting "Calculate", the result of your "BMI" will be produced. See screen below.

Figure 17. Screenshot showing completed fields for BMI calculator

16. If the User would like to find out what his/her "BMI index" means, an external link is

provide below your results to give further information about the topic. See screen below.
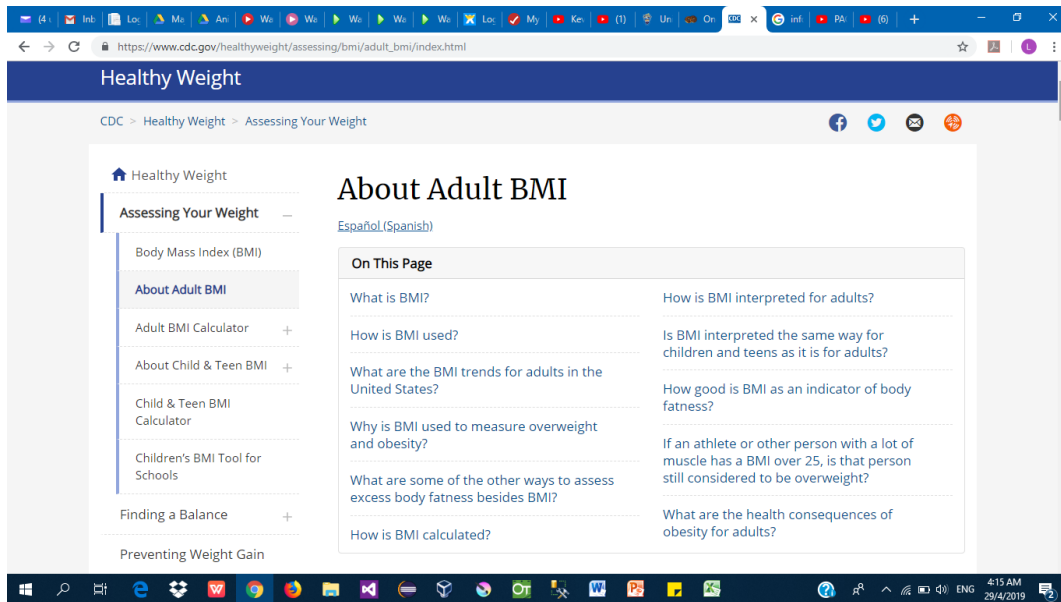
Figure 18. Screenshot showing webpage providing information about BMI

17. Users are also able to view out media page by selecting 'media' on the menu tab, see
screen below.
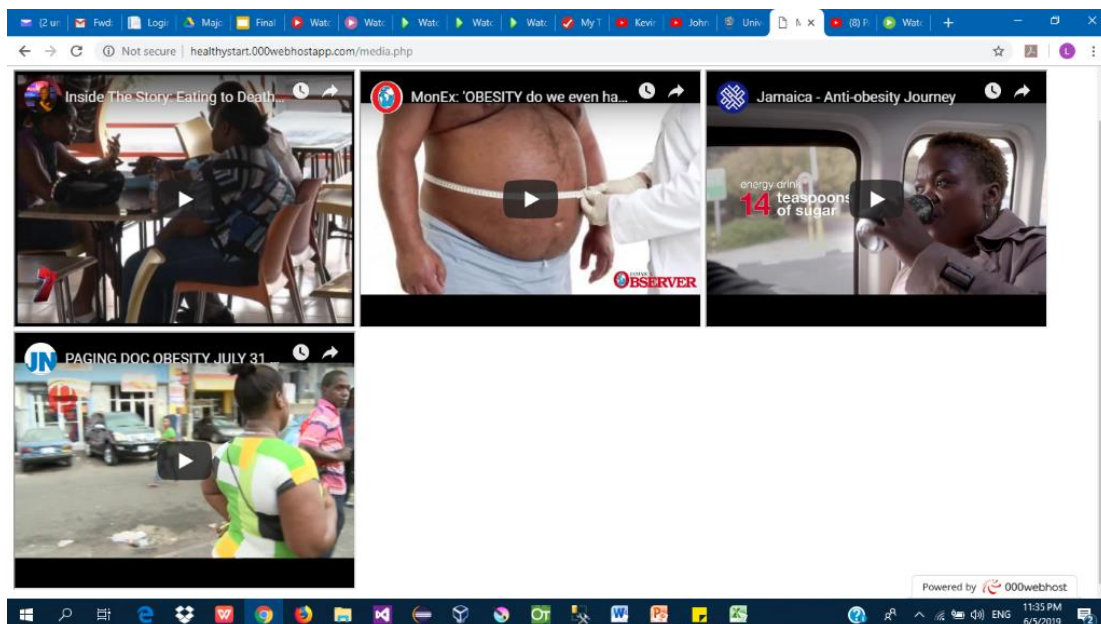
Figure 19. Screenshot showing the Media page

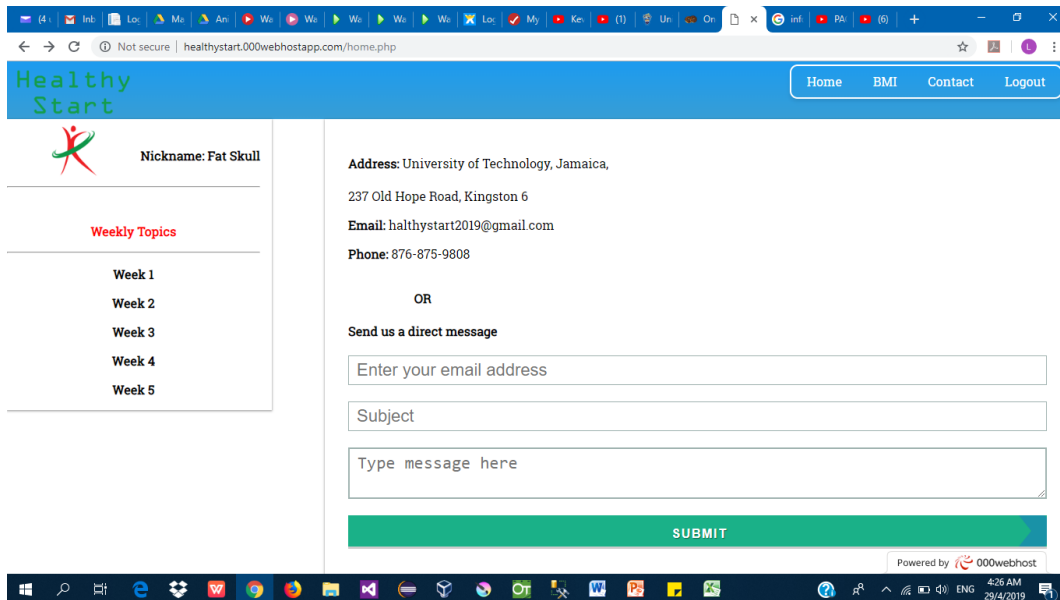18. Users are also able to contact us to provide recommendations or a query, see screen

below.

Figure 20. Screenshot showing the contact page

19. Upon selecting "logout" the user would then exit the portal which takes he/she back to

the login screen, see screen below.
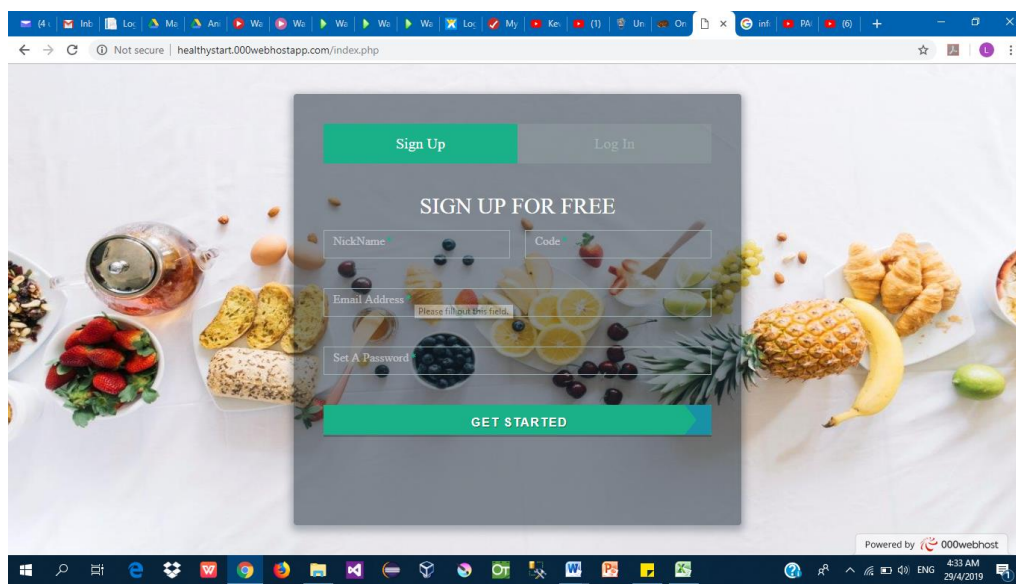
Figure 21. Screenshot showing landing page after a user logs out

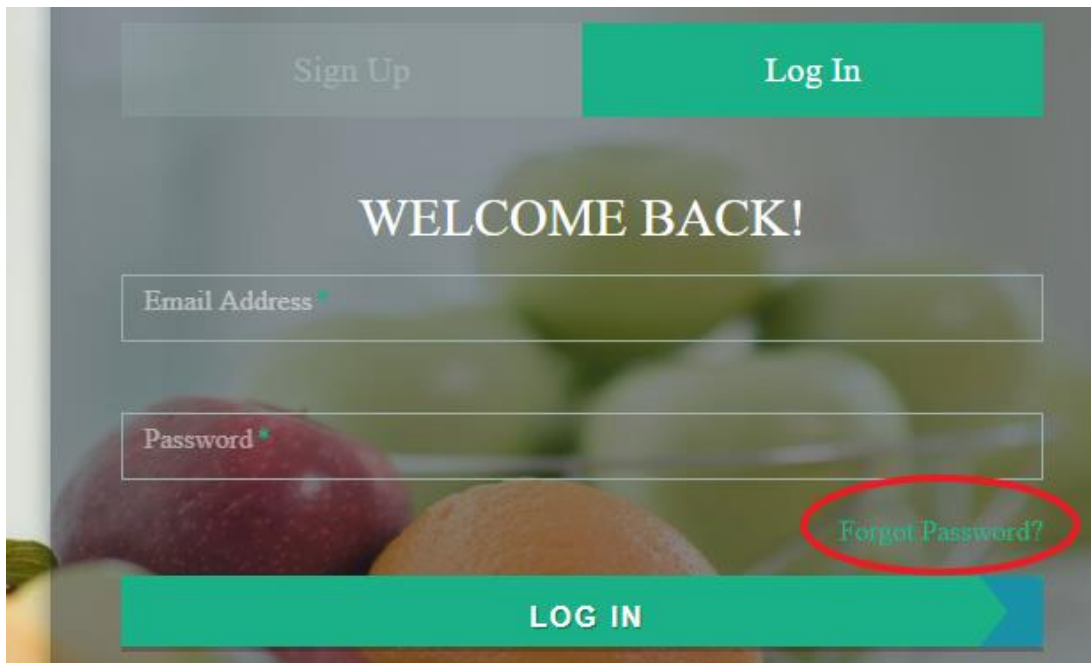20. In the case where participants forget their password, they can click the "forget password"

link.

Figure 22. Screenshot showing the "Forgot Password?" option

21. Participants should enter their email address and click the generate password button.
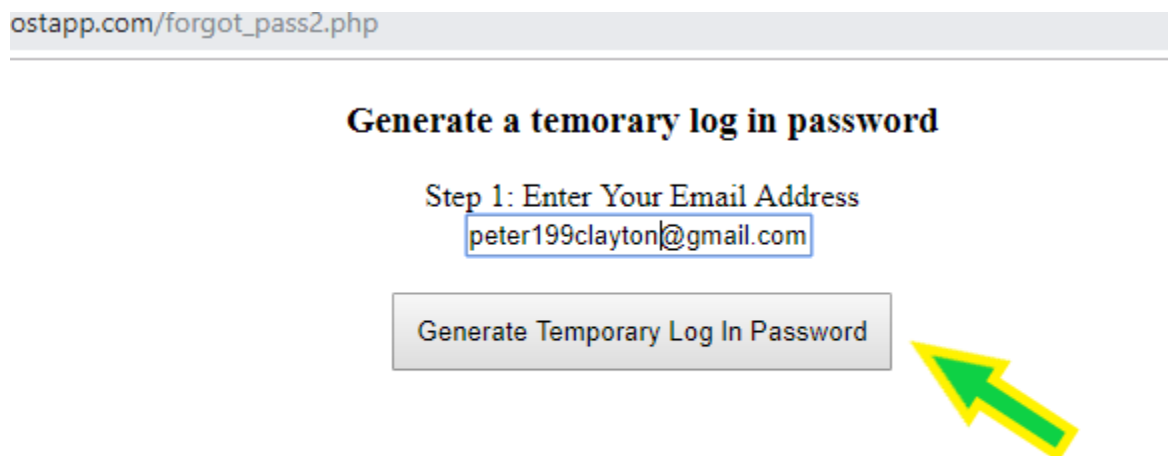

Figure 23. Screenshot showing page for generating a temporary password

22. Confirmation message after participant generate new password.

Figure 24. Screenshot showing confirmation that temporary password has been sent to email

23. After a few minutes an email will be automatically sent to participants with a temporary
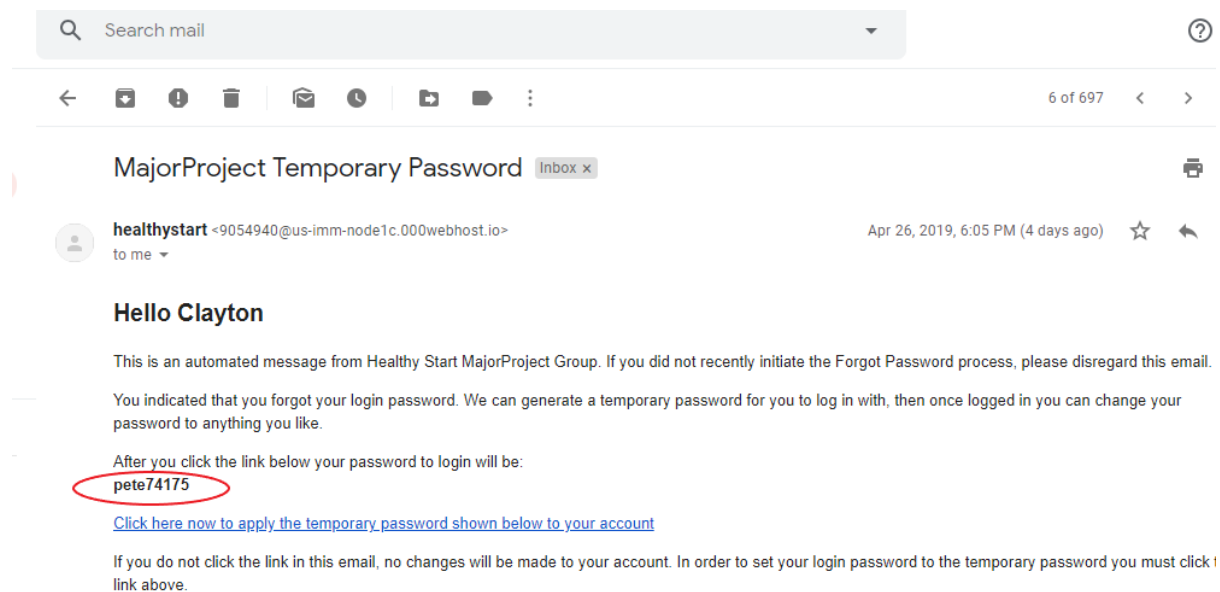
password.

Figure 25. Screenshot showing the receival of temporary password