

Creating better knowledge and skills in the Maltese Hospitality Industry on how to cater for Diabetics

Steve D'Anastasi

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Author Steve D'Anastasi	
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<p>According to the IDF Atlas, Malta has a 13.2% prevalence of persons suffering from diabetes amounting to 42,300 persons (2017) aged between 20 to 79 years old. This is quite alarming since the global prevalence is 8.8%, putting Malta with a 4.4% higher than average percentage globally. This together with the lack of knowledge amongst chefs working in the industry triggered the author to do this research and create this module for chefs.</p> <p>The main aim of this thesis is to improve the level of knowledge and skills amongst people working in the industry to cater for diabetics in the right way. This will be done by creating a short practical course to cook and serve suitable dishes for diabetics.</p> <p>The Below three sub objectives were developed to support this study, these will help by giving a more in depth study of the Maltese Market and help in coming up with a more customized approach.</p> <ul style="list-style-type: none"> • Determine whether there is enough knowledge amongst chefs working in the local industry of how to cater for diabetics. • What are the requirements needed to create a practical short pastry course for chefs working in the industry and diabetes patients in Malta? • Creating a scheme of work of all the practical lessons together with recipes to be used for the course. Analyzing the recipes making sure they are suitable and healthy for diabetics. <p>The author did research about the condition itself focusing on how the diet affects the condition and how it can be controlled with the food consumed. Recipe modification is also a very important part using different forms of sugars, fats and starch.</p> <p>Feedback, A quantitative research amongst seventy chefs was done, with most of them saying that this course will be highly beneficial for the industry as there is lack of knowledge amongst all chefs.</p> <p>Following the findings in the questionnaire the author did a scheme of work with recipes suitable for diabetics. Recipes were analysed and nutritional content tables were created and put on the same standard recipe sheet</p> <p>Through this thesis one will be able to follow step by step instructions on what should be done when creating any vocational course, All one needs to do is change the context however the same principles apply.</p>	
Keywords Diabetes, Dieting, Chefs, Practical Course, Hospitality	

Table of contents

1	Introduction	1
2	Diabetes.....	3
2.1	Complications in Diabetes.....	3
2.2	Diabetes Statistics Globally.....	5
2.2.1	Diabetes in Europe.....	6
2.2.2	Diabetes statistics in Malta.....	7
2.3	Different types of diabetes	7
2.3.1	Type 1 Diabetes.....	8
2.3.2	Causes of type 1 diabetes.....	8
2.3.3	Type 1 Diabetes Management	10
2.3.4	Type 2 Diabetes.....	12
2.3.5	Causes of type 2 Diabetes	13
2.3.6	Type 2 Diabetes management.	14
2.4	Diabetes and Dieting.....	15
2.5	Modifying recipes for diabetics	19
3	Strategies for modern Pedagogy.....	20
3.1	Vocational Pedagogy	22
3.2	Employee training	24
4	Quantitative surveys for chefs	27
4.1	Questionnaire results	28
5	Course designing	37
5.1	“Diabetes course for Chefs” design steps.....	37
5.2	Module descriptor	40
5.2.1	Scheme of work	41
5.3	Diabetic Recipes for course.	42
5.4	Course material feedback.	45
6	Discussion.....	47
	References	50
	Appendices.....	52

1 Introduction

As part of the master's degree with Haaga Helia, university of applied science the author needed to do a thesis based on his line of interest and field of work. At first the author was a lost on what topic to choose, due to the fact that he did not want to encounter the same problems he came across when doing his degree thesis, which was a huge lack of information in the subject chosen. After talking through it with his peers and superiors at work and making extensive research he saw there was lack of knowledge related to diabetes in the industry. According to the IDF Atlas, Malta has a 13.2% prevalence of people suffering from diabetes amounting to 42,300 people (2017) aged between 20 to 79 years old. This is quite alarming since the global prevalence is 8.8% putting Malta with 4.4% higher than average percentage globally. (Karuranga, 2017)

The author is a chef lecturer working within the pastry department, and the author himself had limited knowledge on how to cater for a diabetic person let alone the students and people working in the hospitality industry. To verify this the author informally interviewed one of his peers who is a diabetic. During the interview the sense of frustration could be felt, resulting in a lot of restaurants on the island not serving any type of sugar free dessert. Being a Mediterranean country, we are accustomed to using high levels of sugars instead of using sugar substitutes which are safe for this condition.

With all this in mind the author decided to do the thesis based on what is needed to create a short pastry course, to raise awareness and knowledge amongst chefs working in the Maltese hospitality industry. This course can also be catered for diabetics themselves, to be able to create adequate desserts for their own consumption.

Through this thesis the author will be analyzing the statistics of how many diabetics there are on the island and what type is the most common in Malta, What is the diabetes condition all about, going through both types of diabetes and how they can be incurred whether it is hereditary, or it can be contracted as a normal illness? Linking to the previous point what is being done by the Maltese health authorities regarding this condition. The author will also be going through what types of food can be consumed by people suffering from this condition. Since at the end of the day a course needs to be created the author will also be going through different pedagogy methods that can be used to create and deliver this practical short course.

The main objective of this thesis is to improve the level of knowledge and skills amongst people working in the industry. This will be done by creating a short practical course to cook and serve suitable dishes for diabetics. To accompany the main objective the author did another three sub objectives:

Determine whether there is enough knowledge on diabetes amongst chefs working in the local industry.

What are the requirements to create a practical short pastry course for chefs working in the industry and diabetes patients in Malta?

Creating a scheme of work of all the practical lessons together with the recipes to be used for the course. Analyzing the recipes making sure they are good and healthy for diabetics.

The writer strongly believes that the final product of the thesis will be highly beneficial to a lot of persons namely; People in the industry and entrepreneurs being able to serve safe food for this condition, will open-up new market segments they can tap into generating more revenue for their businesses. Pastry chefs will highly benefit as well by broadening their skills and knowledge to a continuously growing market (unfortunately). Institute of Tourism Studies will also benefit by generating more revenue through this new short course that can be offered on a part time basis for this niche market, that is currently not being addressed by any other teaching institution on the island. Institute's full-time students will also benefit, since the author himself will get a higher level of knowledge and be able to transfer it to prospective chefs through their normal pastry sessions. But most of all the people that are going to benefit most from this are the persons suffering from the condition itself. They will be able to come for a short course themselves to learn more about how they can cook safer desserts. Through training of chefs in the industry they will be able to go to restaurants and have a good dessert that is safe for their consumption without the need to worry much about their condition.

2 Diabetes

Diabetes is a chronic disease that occurs when the pancreas is no longer able to produce insulin by themselves, or the body is not able to utilise the insulin that is being produced by the pancreas. (Dods, 2013)

When consuming foods especially carbohydrates the body needs to extract the natural sugars there is in them to be able to generate the energy required by the body. The body maintains a good glucose accumulation balance in the blood from dieting. Majority of the glucose removal from the blood is done through the transport into cells where it is metabolised to produce energy. Very small quantities of the blood glucose are removed through the kidneys. The normal fasting range of blood glucose level is a narrow 95-110 mg/dl (milligram per decilitre). Any condition or instance that interferes with the removal process will result in hyperglycaemia and therefore causing diabetes. Hyperglycaemia is when the blood Glucose levels are too high, and this can be produced through lack of insulin produced by the pancreas. (Dods, 2013)

Insulin is a hormone produced in the pancreas that allows glucose coming from the food we eat pass through the blood stream into the cells in our body to produce and give energy to the human body. All carbohydrate foods are broken down into glucose in the blood and insulin assists glucose get into cells. Not being able to produce or utilise the insulin in the right way will lead to raised glucose levels in the blood known as Hyperglycaemia. Over a long period of time Hyperglycaemia is associated with failure of various body organs and tissues it can also lead to diabetic coma. (Boulton, 2019)

The international diabetes Federation has estimated that there are 382 million persons have diabetes worldwide and numbers could go up to 592 million by the year 2035. These numbers are very alarming and further continued to encourage the author to do his research on the topic. The research will be highly required to increase more awareness amongst people working in the hospitality industry to cater better for their increasing customer demand. (Scobie, 2014)

2.1 Complications in Diabetes

Diabetics have an increased risk of developing serious health problems due to constant high blood sugar levels which can lead to serious disease effecting the heart, blood vessels, eyes, kidneys, nerves & teeth. Apart from all that diabetics are highly susceptible to develop infections. In almost all high-income countries diabetes is the leading cause in cardiovascular disease, blindness, kidney failure and amputation of the lower limb. People

with diabetes must do regular check-ups to check whether they are still controlling their condition.

Cardiovascular disease affects the heart and the blood vessels, causing fatal complications such as coronary artery disease which leads to heart attack and also stroke. Cardiovascular disease is the most common cause of fatality in diabetic patients. People with diabetes are two to three times more likely to have a cardiovascular disease compared to a normal person. This condition comes from coagulation system in the blood being more active due to high levels of glucose in the blood, increasing the risk of blood clots.

(Boulton, 2019)

Diabetic nephropathy is a disease linked to the kidneys causing damage to the small blood vessels leading to the kidneys causing them to become less efficient or fail to filter the blood. This disease is highly common with people with diabetes, maintaining blood sugar levels to normal will help in reducing this condition drastically. (Boulton, 2019)

Diabetic neuropathy is a condition whereby the nerves system in the body is damaged with high blood sugar levels. This can lead to problems with digestion, erectile dysfunction (inability to keep an erection firm enough through a sexual intercourse) and other body functions. Among the most commonly effected parts are the extremities of the body in particular the feet. Nerve damage in these areas also referred to as peripheral neuropathy, which can lead to pain, tingling feeling and loss of feeling in the effected extremities. Loss of feeling is extremely important as it can cause injuries to go unnoticed leading to serious infections and later the possibility of amputations. Diabetics have a risk of getting amputated 25 times more than any other person. However, with the right care and treatment of the condition many amputations related to diabetes can be avoided. (Boulton, 2019)

Diabetic retinopathy is a condition that effects the eyes, most diabetics will develop some sort of retinopathy causing reduced vision and, in some cases, even blindness. Consistent high blood sugar levels combined with high blood pressure and cholesterol, are the main causes of this condition. Retinopathy can be managed with regular eye checks and keeping glucose levels and lipids as close to normal as possible either with medication or by controlling the diet. (Boulton, 2019)

Oral complications, diabetics have an increased risk of gums inflammation also known as periodontitis if blood sugar levels are not well maintained. Periodontitis is a major cause for tooth loss and is associated with an increased risk of cardiovascular disease. Regular check-ups should be done to ensure early diagnosis, particularly with people with previously undiagnosed diabetes and prompt management of oral complications. Annual visits

are recommended for symptoms of gum disease such as bleeding when brushing teeth and swollen gums. (Boulton, 2019)

2.2 Diabetes Statistics Globally

Diabetes is on the increase all around the globe as reported in the most recent (8th edition) of the international diabetes federation diabetes Atlas. It is also the leading cause of death worldwide with a 30% loss of life expectancy from diabetes. (Karuranga, 2017) According to International Diabetes Federation IDF statistics, presently every seven seconds someone is estimated to die across the globe due to diabetes or its complications. With 50% of those deaths (4 million per year) are persons under the age of 60. This is based on a global prevalence of 8.8% (424.9 million) of the world population in 2017. The numbers are expected to increase to 9.9% (628.6 million) by the year 2045. Disturbingly the figures show that 50% of all individuals with diabetes are undiagnosed especially in developing countries. (Karuranga, 2017)

The below chart shows statistics according to the IDF diabetes Atlas since its first research, showing an alarming forecasted increase by the year 2045.

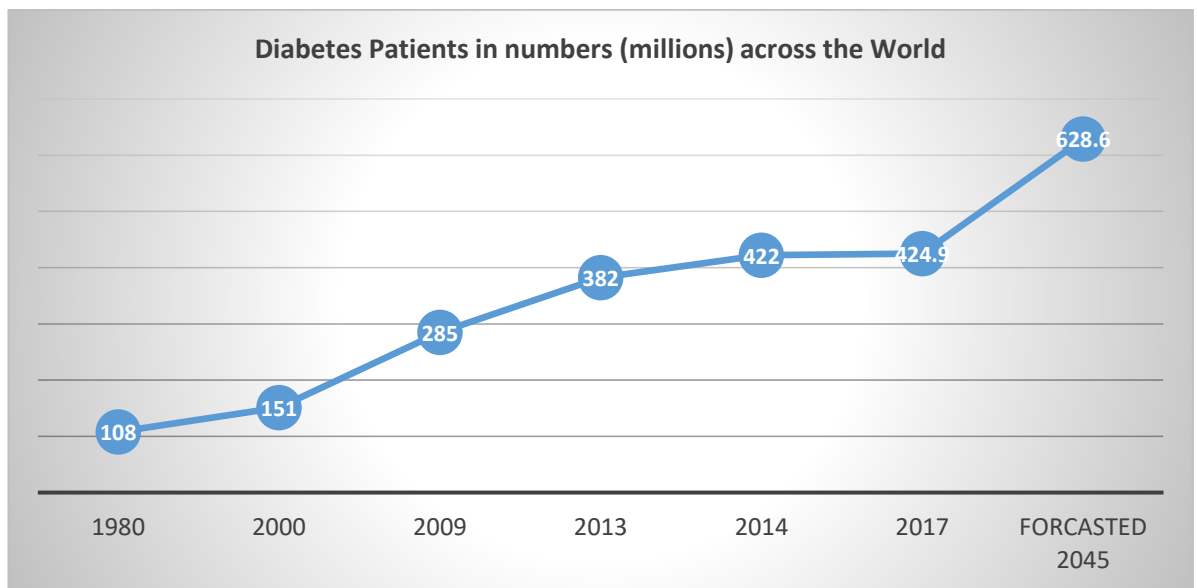


Figure 1. Diabetes statistics worldwide over the years. (Karuranga, 2017)

It is also believed that the number of adults with diabetes has increased globally due to two main factors being population growth and aging population. Besides these 2 main factors there is also the global obesity epidemic which has turned out to be a key factor in the spike in the rise of diabetes. (Standl, 2019)

In addition to this the IDF atlas estimates another 352.1 million persons worldwide (2017) having a pre stage diabetes called Impaired Glucose Tolerance (IGT), which is anticipated to rise to 531.6 million by the year 2045. (Karuranga, 2017)

On a global scale type 2 diabetes hits particularly middle-aged people between 40 to 59 years of age which in turns causes serious economic and social implications. Further to that diabetes affects mostly middle-income countries, 77% of the people with diabetes live in these countries.

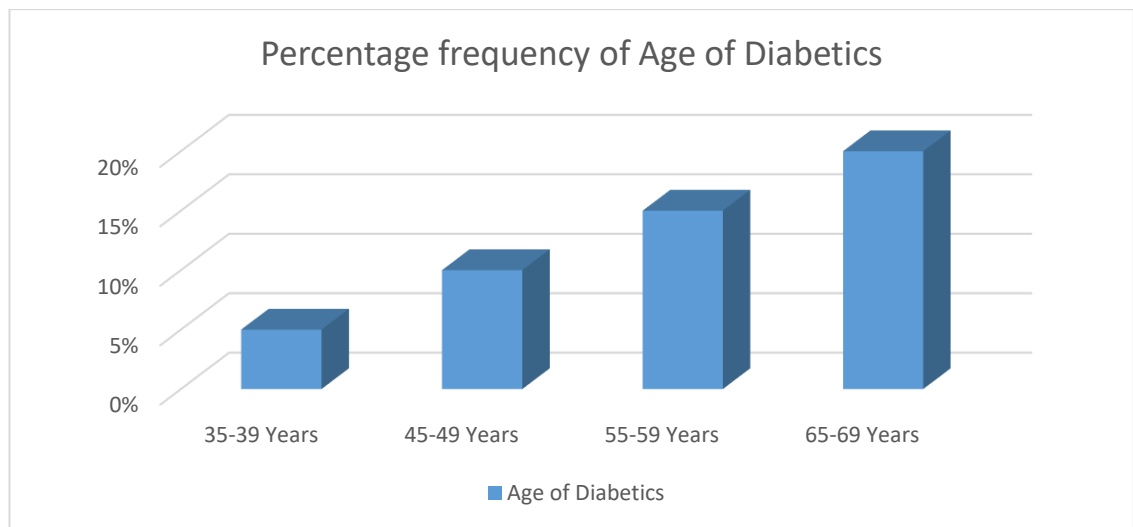


Figure 2. Percentage of type 2 diabetics according to age group (Karuranga, 2017)

The above table shows the statistics of type 2 diabetes categorised according to their age group. According to IDF 90% of the diabetics are type 2 thus the above statistics are based on type 2 diabetics. These diabetics are characterised by relative insulin deficiencies in conjunction with a wide spectrum of insulin resistance. As for type 1 diabetes in persons between the age of 0 to 19 years old, IDF atlas reports that there is 1,106,500 persons suffering from this condition with an annual incidence of 132,600 new cases diagnosed. (Karuranga, 2017)

2.2.1 Diabetes in Europe

Across all the 57 countries and territories around Europe the gross national income varies a lot from 76,000\$ per capita in rich countries to 2,120\$ per capita in poor countries. The total number of persons suffering from diabetes estimated in this large region is about 58 million representing 8.8% of the total population aged 20 to 79 years old. It is estimated that there will be 66.7 million adults with diabetes by 2045. Aging population is one of the main factors in Europe, spiking an increase in numbers of type 2 diabetes. Europe has the highest number of children and adolescents (0-19 years) suffering from type 1 diabetes

with 286,000 cases, compared with other IDF regions. It also has one of the highest incidence rates of type 1 diabetes with 28,200 new cases diagnosed per year. The largest contributing countries to type 1 diabetics are Russian Federation (43,100), UK and Germany,

Mortality rate due to diabetes is recorded at 477,000 across all Europe per year, about 32.9% of these are under the age of 60 years.

Europe has the second largest healthcare expenditure on diabetes with 23% of total money spend on diabetes globally amounting to 166 billion USD per year. (Karuranga, 2017)

2.2.2 Diabetes statistics in Malta

According to the IDF Atlas Malta has a 13.2% prevalence of persons suffering from diabetes amounting to 42,300 persons (2017) aged between 20 to 79 years old. In the authors opinion this is quiet alarming since the global prevalence is 8.8% putting Malta with 4.4% higher than average globally.

The number of persons with undiagnosed diabetes is of 15,100 persons. Deaths is quiet low with two hundred persons per year, this shows that health care is quite good on the island. Total health expenditure on diabetes is of 117.1 million USD per year, giving 2,778.3 USD per person with diabetes.

The number of infants and adolescents in Malta with type 1 diabetes is of 1700 with an annual incidence rate of 20.5 per 100,000 of newly diagnosed children per year. (Karuranga, 2017)

2.3 Different types of diabetes

There are several different types of diabetes, some of which are more widespread than others. This is a list of diabetes that are not so common; Gestational diabetes, LADA diabetes (Latent Autoimmune Diabetes of Adulthood), MODY diabetes (Maturity Onset Diabetes of the Young), Double diabetes, Steroid-Induced diabetes, type 3 diabetes, Brittle diabetes, Secondary diabetes, Diabetes insipidus and Juvenile diabetes. All these small contributors to the general diabetes condition they have very similar effects and symptoms to type 1 and 2 diabetes hence the author will be concentrating on these two for his research.

The most common type amongst the general public is the type 2 diabetes which often develops from pre-diabetes. Pre-diabetes also sometimes referred to as borderline diabetes, is a metabolic condition which is a fast-growing global problem closely tied to obesity. If obesity is un-treated it can develop into type 2 diabetes, and although it is treatable it is

still currently not fully reversible. The other type that is also very common is the Type 1 Diabetes which is generally more common in children (Diabetes.co.uk, 2019)

2.3.1 Type 1 Diabetes

Type 1 diabetes is an autoimmune disease that causes the insulin producing beta cells in the pancreas to be destroyed. This will prevent the body from producing enough insulin to regulate the blood sugar levels. Since it causes loss of insulin production, it therefore requires regular insulin administration either by injection or by insulin pumps. Although it is most commonly found in children and young adults however it can be contracted at any age, in adults it grows slightly slower compared to the pace in children. Type 1 diabetes symptoms must be taken seriously and action upon them must be taken as soon as possible as this condition can be deadly. (Samaras, 2014)

Table 1. Key features of type 1 diabetes Mellitus (Samaras, 2014)

<p>Key features of type 1 Diabetes Mellitus:</p> <p>Insulin is necessary to sustain life</p> <p>Relatively acute onset disease</p> <p>Onset is most common in youth's, but it may occur at any age.</p> <p>Presence of specific autoantibodies</p> <p>Positive family history in 10% of patients</p> <p>30-50% chance in identical twins</p>

2.3.2 Causes of type 1 diabetes

This disease belongs to a group of conditions known as autoimmune diseases, it's a condition whereby the body incorrectly identifies its own useful cells as an attacking organism and attacks them. This condition is caused by a fault in which the body's immune system mistakenly targets and kills beta cells present in the pancreas that produces insulin. The more beta cells are killed, the body will not be able to produce enough insulin by itself to control the blood sugar levels. From there onwards diabetes symptoms as mentioned earlier on by the author will start to appear. (Boulton, 2019)

What causes the initial malfunction in the body is still unknown. However, research suggests that condition might result from a combination of genetic predisposition being triggered by something in the environment. Although it is still not scientifically proven what

triggers the immune system to behave in this way however the strongest evidence is pointing towards a virus that is most likely triggering this reaction in the body. With regards to genetic predisposition researchers have discovered that there are at least 18 different regions of weakness and generally they link to each other like for example celiac and lactose. On the other hand, whilst genetics offer clues as to why some people are more susceptible to type 1 diabetes whilst others with the same genes are not. A perfect example is having an identical twin with type 1 diabetes does not necessarily mean that the other twin will have type 1 diabetes. (Samaras, 2014)

Researchers have hypothesized that whilst some people have genetic predispositions to type 1 diabetes there is likely to be an environmental trigger that initiates this disease. Some of the triggers that have been suggested are the following: (Diabetes.co.uk, 2019)

Viral infections:

Associations have been found between type 1 diabetes and several viruses of these enteroviruses have drawn the most interest of researchers. Studies shown that enteroviruses have been recorded to have higher levels in pregnant mothers of children that later on in their life developed type 1 diabetes. (Diabetes.co.uk, 2019)

Low levels of vitamin D

Researcher have also found that countries further from the equator tend to have higher chances to have type 1 diabetes. This is mainly due to the lack of sunshine there is in these countries such as UK and Scandinavian countries. Studies have also shown that people with lower levels of vitamin D have a higher incidence rate of having type 1 diabetes. Another study held by EURODIAB sub study 2, have shown that the supplementation of vitamin D appeared to lower the risk of type 1 diabetes. (Diabetes.co.uk, 2019)

Increased insulin demand.

If a person consumes a high quantity of glucose rich foods daily this will lead to the body trying to generate a lot of insulin to absorb the sugar. A study held by the Colorado university, published in 2008 showed that a diet with high glycemia index foods could speed up the progression of type 1 diabetes in children.

A lot of research has been going on to check whether there is any relationship between early nutrition in infancy and type 1 diabetes. Although conclusions are not yet approved however there is strong evidence that there is a relationship amongst them. A recent Finnish study shows that the consumption of fish fat may reduce the risk of type 1 diabetes with a genetic susceptibility for the disease. Breast milk also provides a good protection against type 1 diabetes, mainly attributed because of the fatty acids present in the milk.

According to the main researcher of these findings said that according to the findings it indicates that the first year of a child's life is very important in terms of prevention as it is when the body's immune system is developed having long term effect on the health of the individual. (Niinisto, 2017)

2.3.3 Type 1 Diabetes Management

Diabetics is a chronic progressive disease, however people who have it can still live a long and high-quality life with the right diabetes management treatment. This includes management of not only blood sugar levels but also cardiovascular disease risk factors such as hypertension and hypercholesterolemia (cholesterol in blood vessels), using healthy diet, recommended levels of physical activity and correct use of medications as prescribed by professionals. (Boulton, 2019)

As also mentioned above in type 1 diabetes the problem with this type of diabetes is the lack of production of insulin by the pancreas therefore the individual has to replace that supply of insulin themselves through either injection or insulin pumps. Type 1 diabetes can be life threatening if not taken care of properly. Insulin injections can be taken up to 6 times per days to maintain a blood sugar level of between 4 to 6 mmol/L however this range may vary according to the individual circumstances. Monitoring and maintaining blood sugar levels right will help the diabetic to reduce the risk of both long- and short-term complications.

Keeping the blood sugar levels low can also be maintained with a good diet and physical activity apart from medication. Below is a list of what can be done to better manage Type 1 diabetes condition.

Insulin medication

Insulin is something that is normally produces by the pancreas and released into the blood stream when a person eats something, this helps to move glucose from the food to the cells used for energy. However, in a person with type 1 diabetes insulin is produced in small quantities or none are produced whatsoever, therefore insulin replacement has to be taken on a daily basis. At this stage insulin can only be taken in the form of an injection as no form of pill has yet been developed, taking insulin as a tablet means that it will get destroyed in the stomach and never reach its aim to convert glucose into energy.

When a diabetic takes insulin it acts to reduce the glucose levels to in the blood, when glucose is at its lowest levels the effects of insulin is said to have reached its peak. After this the effect gradually wears off and blood glucose levels raise again.

The fast-acting insulin is clear in appearance and will start to work from 1 to 20 minutes after injection, it will reach its peak after approximately 1 hour and last for 3 to 5 hours. After injecting fast acting insulin, a diabetic has to eat straight away otherwise risks of getting hypoglycaemia. (Diabetes.co.uk, 2019)

Blood glucose monitoring

One of the main aims of diabetes management is to keep blood glucose levels in control within the 4 to 6 mmol/L. The key in maintaining this is by balancing the diet with physical activity and medication, the Blood glucose monitoring can help a patient understand better the relationship between these factors. Over a period of time the readings will provide a clearer picture to diabetic professionals on how to proceed with medication in that particular case. Apart from reducing the risk of developing a range of diabetes-related complications by regular monitoring. The number of times a person needs to check their blood glucose level may vary from one person to another. However, structured self-monitoring of blood glucose levels throughout the day is recommended (4 times a day). Monitoring can be done using a blood glucose meter, a Lancet device using lancets or a glucose test strip. The most convenient being the meter as it gives accurate digital reading of the glucose levels that can also be recorded on the same device. Testing the blood glucose level will help the diabetic in better understanding the relationship between the blood glucose level and the exercise the person is doing, the food eaten and other lifestyle influences such as travel, stress and illness. Through this confidence will be gained in looking after him/herself and the condition. (Diabetes.co.uk, 2019)

Something which is relatively new technology in reading blood glucose levels is the flash glucose sensor. It enables the user to measure the glucose level without having to prick their finger every time. The system has 2 parts a small disk that is positioned at the back of the upper arm, this has a sensor which is just under the skin and a reader which when held over the sensor will give the blood glucose level reading. The reader is also connected to a software which will give the patient trends and tracking patterns of his/her glucose levels.

Eating well & dieting.

Having a healthy diet and being active is a very important part of managing diabetes as it will help diabetics manage their blood glucose level and their overall body weight. Cooking for a diabetic does not require doing something completely different and everyone can enjoy the same healthy meal in a household. There is no need to prepare separate meals for a diabetic what is generally done is reducing carbohydrates in meals to reduce the glu-

cose levels consumed. However, it is highly recommended that a diabetic goes to a dietician so they can get a tailored diet to fit for their needs and lifestyle. (Diabetes.co.uk, 2019)

As a general guideline for a diabetic they should follow the following points;

Table 2. General dieting guidelines for type 1 diabetics

Eating regular meals and spreading them throughout the day
Eat a diet that is lower in fats especially saturated fats
If insulin has to be taken a diabetic might need to have insulin between meal snacks as well
Drinking a lot of water is also highly important

Exercising

As mentioned above everybody needs regular exercising but if you are at risk of having diabetes it plays an important role in keeping you healthy. The benefits of a diabetic person doing exercise are; insulin will work better, which will in turn improve the diabetes management. Maintaining a healthy weight, reducing stress with workout's, lowers blood pressure and reduces the risk of heart disease. However, it is highly recommended to do a complete health check-up at the doctor for any complications. When a person should start with physical exercise this should be done gradually. Any kind of physical activity can be done just as long as it gets the person doing something physical. For good health it is recommended to do 30minutes per day unless a person needs to lose weight in which case it goes up to 45 to 60 minutes per day. Exercise will also help prevent long term complication in the future related to type 1 diabetes. (Smith-Marsh, 2014)

2.3.4 Type 2 Diabetes

Type 2 diabetes is the most common type of diabetes accounting to 90% of all diabetes cases worldwide (O'Neill, 2019). Type 2 diabetes is generally insulin resistant and the body does not fully respond to the insulin supplied both naturally or by injection. This causes blood glucose levels to continue to increase and the body producing even more insulin without any effect. This condition can cause the pancreas to be exhausted in some people resulting in the pancreas producing less insulin as it goes on. This will cause even higher levels of hyperglycaemia.

Although this condition is generally diagnosed in older people however, it is increasingly being seen on children, adolescents and young adults due to the high levels of obesity, poor dieting and lack of physical activity.

Type 2 diabetes is a serious condition that often requires the use of anti-diabetic medication or insulin to regulate blood sugar levels low. However, the side effects and complications brought about by this disease can be avoided if detected and treated at an early stage. Recent research found that many people with type 2 diabetes were able to reverse diabetes through low carb diets, low calorie diets and exercising.

2.3.5 Causes of type 2 Diabetes

Some diabetic risks come from a person's genetics however many other risk factors are preventable through dieting and healthier lifestyle. Below is a list of all the possible risk factors that can lead to type 2 diabetes.

Obesity is the major type 2 diabetes risk, with millions of people around the world being obese. In UK alone almost one in four adults is obese and the numbers continue to increase both amongst adults and in children. Number of children diagnosed from type 2 diabetes is increasing drastically in UK alone one in three children are diagnosed with this condition. Obesity is believed to account for 80 to 85% of the risk for developing type 2 diabetes. Recent studies suggest that obese persons are eighty times more likely to develop type 2 diabetes. (Diabetes.co.uk, 2019)

Consuming un-healthy food is also a major cause of type 2 diabetes as mentioned above with 90% of type 2 diabetics are overweight. The so-called western diet consisting of a high quantity of processed foods, poor quality fats and little fibre content is taught to be a major contributor to diabetes. Therefore, as stated above with a healthy diet and enough exercising can prevent or revert the development of type 2 diabetes. Picking a healthy diet can be something that is not easy to do as it must be tailor made to the needs of the individual, seeking professional advice is highly important to be successful. (Diabetes.co.uk, 2019)

Related to obesity is the lack of exercising by having a lifestyle constantly seated without enough exercise can be highly dangerous for health. Being physically inactive can lead to being overweight which in turn can lead to pre-diabetes and type 2 diabetes. Being physically active will also decrease insulin resistance and help the insulin produced by the pancreas to be more effective. It is recommended that a person at least does thirty minutes of physical activity at least five times a week.

Another major risk for type 2 diabetes is gestational diabetics as it affects two to five percent of pregnant women. Women who have this during pregnancy have a greater risk of developing type 2 diabetes later in their life and so do their children.

Having a close family member with type 2 diabetes can increase the risk within the family to develop this disease. Unfortunately, not much can be done to avoid this, but being aware of the symptoms of type 2 diabetes, eating healthy and exercise regularly can mitigate this from occurring.

As the population of the world ages diabetes rates are on the increase. It's a known fact that the older a person gets the higher the risk of developing type 2 diabetes. This is since as a person ages the pancreas weakens and start to produce less insulin furthermore body resistance to insulin increases.

2.3.6 Type 2 Diabetes management.

First type of treatment that is generally offered to type 2 diabetes patients is a combination of diet modification combined with the appropriate and regular exercise as prescribed by a professional person tailor made for the individual needs of the patient. The National Institute for Health and Care Excellence (NICE) guidelines encourage type 2 diabetes patients to have a high fibre, low-glycemia-index (Low-GI) carbohydrates in the diet. This diet allows flexibility and makes it possible to follow a range of different diets, including low-carb and low-calorie foods, whilst ensuring a person gets a good source of low-GI foods such as vegetables, beans and pulses. (NICE, 2019)

Low carbohydrate and low-calorie diets:

This diet will help with weight loss and lowering of blood glucose levels, this is due to metabolised carbohydrates turn into glucose into the blood stream.

A study held in Newcastle in 2011 also known as the Newcastle diet, found out that following a diet of 600 calories per day for eight weeks the result after three months was that seven out of the eleven persons being studied were free from type 2 diabetes. This type of diet reportedly prompts the body to remove the fat clogging the pancreas thus waking up the insulin production cells. (Diabetes.co.uk, 2019)

Blood glucose testing:

Patients with type 2 diabetes can benefit from testing and monitoring their blood sugar levels regularly as this will provide immediate feedback as to how the body and the condition is reacting towards the person's lifestyle. Regular structured blood glucose testing will help the person to correct anything that spiked an increase in blood sugar levels. This will help patients understand better the impact of certain foods on the blood glucose levels and help them in maintaining a healthier lifestyle through monitoring.

Medication:

Persons suffering from this condition might also be prescribed medication in the form of either tablets or injections. Metformin is one of the most commonly prescribed medicine for type 2 diabetes which helps the body respond better to insulin. After being with this condition for quite a long time some patients might also be prescribed insulin injections permanently.

2.4 Diabetes and Dieting

People with type 2 diabetes should eat different foods from the five different food groups, providing the person with the nutrients needed to prevent chronic disease and be healthy.

Table 3. Points to keep in mind to manage type 2 diabetes: (Anon, 2019)

Points to keep in mind to manage type 2 diabetes:

- Eating regular meals spread through the day.
- Eating a diet low in fat particularly saturated fats
- If taking insulin or diabetic tablets, between meal snacks might be needed
- Recognise that everyone's needs are different, everyone should seek professional advice on individual basis as to have the best diet tailor made for their needs.
- Might consider following a low carb diet.

Creating a balance of how much energy is needed through the day with how much energy is being consumed is very important for a person with type 2 diabetes. Putting too much energy in the body will lead to weight gain and this in turn will make it difficult to manage the condition apart from increasing the risk of having a heart attack or stroke. Foods that are high in energy such as; take away junk foods, sweet biscuits, cakes, lollies, chocolate, savoury snack packets, sugar sweetened drinks and juices should be avoided or limited to a few times. Other persons eat healthy however they consume too much food, reducing portion size is another way to reduce the energy intake by the body. This justifies the need that a person needs to consult professional people to adapt a diet to the patients' needs and lifestyle. (Townend, 2019)

Fats have the highest amounts of energy of all foods and eating too much fat will cause a person to put on weight. This makes it extremely difficult to manage blood glucose levels. Although needed by the body fat is needed in small quantities and saturated fats should always be avoided. Saturated fats will increase LDL cholesterol which is extremely harmful for the body. Saturated fats come from animal products however there are also vegetable fats that are harmful like palm oil and coconut products, so these should be avoided.

Steps one should follow to reduce the consumption of saturated fats:

- Choosing reduced or low-fat milk, yogurt, cheese & ice-creams
- Choosing lean meat and trim any fat before cooking
- Removing the skin off poultry before cooking
- Avoiding the use of lard, butter, dripping, coconut milk, sour cream and hard cooking margarines
- Limit the consumption of cakes, puddings, pastries, chocolate and cream biscuits to special occasions occasionally.
- Limiting the consumption of pre-packed biscuits, savours snack packets and frozen convenience meals.
- Limiting the use of processed meats and deli including sausages.
- Avoiding the consumption of fried junk food like fried chicken opting for grilled chicken without skin instead.
- Avoid convenience pies, sausage rolls and pastries.
- Choosing sauces and dressings that are not cream based, having tomato-based sauces or soy or any other low-fat ingredients.
- Limiting the consumption of creamy based soups. (Townend, 2019)

Consuming small amounts of polyunsaturated and monounsaturated fats will help the person get the essential fatty acids and vitamins needed by the body. Examples of monounsaturated fats are; canola and olive oil, some margarines and avocados. Whilst oily fish, sunflower, safflower, soybean, corn, cottonseed, sesame and grapeseed oils together with selected margarines are all polyunsaturated fats. Nuts, nut spreads, seeds and peanut oil contain a combination of both monounsaturated and polyunsaturated fats. Therefore, to be able to consume a healthier diet it is highly suggested to use the above-mentioned fats in the diet instead of other fats. Consuming fish and oily fish at least three times a week as it contains omega 3 fats which is good for the heart. (Townend, 2019)

Carbohydrate plays a very important role in the diet and provides the body with energy, fibre, vitamins and minerals which keep the body and bowels healthy. When carbohydrates are digested, they break apart to form glucose in the blood, insulin then transfers the glucose from the blood stream to the muscles, liver and other cells to provide energy. As mentioned above carbohydrates have the biggest impact on blood glucose levels and the effect on a diabetic person depends on what type of carbohydrates and how much carbohydrates are consumed. How much is consumed depends on the individual's lifestyle, age and gender; therefore, a diabetic person is to take advice from a professional

dietician to work out a meal plan for them according to their lifestyle. It is generally recommended to spread small carbohydrate snacks evenly throughout the day. This will help in maintaining constant energy levels without an excessive increase in blood sugar levels. Carbohydrate counting is another way that can be used by everybody; however, it is highly recommended for diabetics to constantly maintain their blood glucose levels as steady as possible. This is done by counting the amount of carbohydrates being consumed by an individual by measuring in grams. To do this an individual need to first know what foods and beverages contain carbohydrates. Learn to estimate the number of grams there is in the food consumed, adding up the number of grams of carbohydrates consumed throughout the day to do the grand total. Nowadays one can use apps available for free to help them in maintaining a record of all this information. As mentioned above ideally this process is first done with the help of a professional dietitian.

Table 4. List of foods containing Carbohydrates. (Marion J. Franz, 2014)

<p>List of foods that contain Carbohydrates:</p> <ul style="list-style-type: none"> • Grains, such as bread, noodles, pasta, crackers, cereals, and rice • Fruits, such as apples, bananas, berries, mangoes, melons, and oranges • Dairy products, such as milk and yogurt • Legumes, including dried beans, lentils, and peas • Snack foods and sweets, such as cakes, cookies, candy, and other deserts • Juices, soft drinks, fruit drinks, sports drinks, and energy drinks that contain sugars • Vegetables, especially “starchy” vegetables such as potatoes, corn, and peas

Carb counting will help an individual by maintaining blood glucose levels as normal as possible and this will result in preventing or delaying diabetes complications such as; kidney disease, blindness, nerve damage or hearth attacks and strokes. Making the person feel better and more energetic therefore enjoying a healthier lifestyle. Daily intake of carbohydrates is not the same for everybody. However, experts suggest that average intake for most people is of fourth-five to sixty percent of the total calorie intake. Persons who are inactive should reduce the above-mentioned percentages due to lack of physical activity. One gram of carbohydrate provides approximately four calories therefore the working has to be made to calculate how much grams are recommended for the individual. This will then need to be distributed through the day having more in the beginning of the day when the person is more active and reducing the quantities in the evening if the person is inactive. The below table shows how a person can calculate how much carbohydrates there is in the food they are eating. All that needs to be done is divide the weight of food (in

grams) being eaten by one hundred then multiply by carbohydrate content in food per 100g. (this can easily be found on product packaging or online) this sum will give the person an amount of carbohydrates in grams there is in that food. (Hitchcock, 2017)

Table 5. Example of working for carbohydrate counting

$\frac{\text{Weight of food in grams}}{100} \times \text{carb per 100g} = \text{amount of carb (grams)}$
--

It is recommended that a diabetic male consumes four to five servings of fifteen grams each of carbohydrates per day whilst for women three to four servings per day are recommended. However, these recommendations will vary from one person to another depending on the lifestyle that a person lives with. (Marion J. Franz, 2014)

Learning to calculate how much carbohydrates are in particular foods can be a bit difficult however the above-mentioned apps can help a lot. The following list of carbohydrate-rich foods individually amount to 15g of carbohydrates. (Marion J. Franz, 2014)

Table 6. List of food giving 15g of carbs (Marion J. Franz, 2014)

<ul style="list-style-type: none"> 1 slice of bread 1 15cm tortilla 35g pasta (raw) 66g rice (raw) 30g pinto beans (dry) 165g mashed potatoes or starchy vegetables 30g dry cereal 25g jelly
--

Other foods are so low in carbohydrates that they do not need to be counted unless excessive amounts are consumed. An example will be non-starchy vegetables 80g will only give 5 grams of carbs. With regards to processed foods the information with how much carbohydrates are found in the product can be found on the nutritional label generally in the form of percentage.

A healthy eating plan for a diabetic can include a small quantity of sugar like spreading jam on a slice of low GI high in fibre bread toast. However, foods that are high in added sugars and poor source of other nutrients should be avoided or consumed rarely. Some sugars may also be used in food and many recipes can be modified to reduce sugars from them. Sugar substitutes that are good for diabetics can also be used instead of normal

sugar. An example of these sugar substitutes are; Stevia, Equal, Sugarine and Splenda. These sugar substitutes are to be used according to the manufactures instructions since they give a sweeter taste than that of normal sugar for example with Stevia one third of the normal sugar used will be needed in a recipe to give the same sweetness. When cooking for a diabetic, recipe selected should be low in saturated fats and high in fibre.

With regards to drinking it is highly recommended to drink a lot of water as it keeps the body hydrated. Water will not have any impact on the blood glucose levels other good beverage choices are; tea's, coffee, herbal teas and soda water. If a diabetic wants to consume a sweet drink this should be done sparingly, and diet drinks should be consumed. With regards to alcohol this should be limited to two standard drinks per day with some alcohol-free days per week.

2.5 Modifying recipes for diabetics

Thinking that cooking for diabetes is something completely different from normal cooking is wrong. One needs to carefully and substitute ingredients to make food suitable and healthier. In this sub-chapter the author will be showing how recipes can be modified for a healthier option for diabetics.

When cooking with fats ideally fats used are in liquid form as solid fats usually contain saturated fats which should be limited and trans fats which should be avoided completely for a diabetic. If in a recipe you need to use solid fats using margarine that is free from trans fats or shortening that is suitable for cooking or spreading will help a lot. If liquid fats can be used there is a selection of different oils that can be used, using neutral flavoured oils if you don't want to change the flavour of the food like for example corn oil and using flavoured oils like olive oil if you need its unique flavour. A lot of dairy products used in baking are high in fat, this fat can be substituted without compromising the taste. Using skimmed milk instead of full fat milk, non-fat yogurt or blended cottage cheese instead of sour cream. As a general rule most recipes can do with 25% to 33% less fat than what it actually says without too much compromise in flavour and texture. Apple sauce or mashed bananas can be used as a substitute for some or all the fats in baked goods. Where possible replace chocolate with coco powder to avoid the use of cocoa fats in a recipe. (M Dansinger, 2018)

With regards to carbohydrates they should be substituted with carbohydrates that gives energy that lasts and with a lot of fibre. Using whole grain products rather than refined and bleached ones, ground nuts such as almond and hazelnut can also be added to these, instead of using a single polished grain a mixture of unrefined grains can be used.

Sugars will spike the glucose level in blood quicker than carbs which are absorbed more slowly in the body therefore they should be avoided. Most of the time sugars can be cut down from recipes by one third without affecting it however more flour is generally required to compensate for it. Dried fruits such as pried apricots, prunes and plums can also be used in recipes to use their natural sugars. Sugar substitutes can also be used as mentioned earlier on however one needs to carefully read the manufacture's instruction with regards to dosage and whether they are suitable for baking. (M Dansinger, 2018) Most of all one needs to be adventurous and experiment with different flavours by replacing sugars and salts with different spices like cinnamon, cloves and nutmeg. Cinnamon may help lower blood sugar levels as studies showed that it may help the body to use insulin better. Reducing salt when cooking will also help a lot, salt can be provided on the table and used sparingly on the food before eating it. Other spices and fresh herbs can also be used instead of salts during cooking to give better flavour. Canned and frozen foods tend to have higher percentages of sodium for preservation therefore it is highly recommended to cook always using fresh produce. (M Dansinger, 2018)

3 Strategies for modern Pedagogy

Pedagogy is the way in which teachers and students interact with each other, the environment used to deliver the learning and the learning tasks delivered to the students. It is all about building a circle of trust and a relationship between student and teacher through communication amongst one another. In past years this was done in 'chalk & talk' method where the teacher would be the one talking and writing notes on the black board while the students are listening and copying notes without the chance of interaction. (Sharples, 2015)

Education and pedagogy have evolved in the last decades and this was brought with a better understanding of how students learn and the need for upgrading to deliver and reach all levels of student abilities. Below the author will be discussing a list of ten innovative learning strategies for modern Pedagogy according to a report by The Open University held in 2015. (Sharples, 2015)

Crossover learning is the learning in an informal setting such as learning during an organised outing by the lecturer. This will help students link better learning done at school with the reality of the world out there creating a link between the classroom and everyday life. These connections might induce further interest and motivation to learn for students. This can be done by linking a theory session to a field trip whereby the students need to take

notes and pictures of what was noticed, followed by a report or presentation once back in the classroom. This will encourage better learning and being part of an experience students tend to remember things better. (Sharples, 2015)

Learning through argumentation can be done in certain subjects where discussions amongst the classmates can give better results and generate new ideas. This will help students in refining their ideas with others and establish or refuse ideas generated. However, this approach needs to be done with the right age group of students, mature students and the lecturer has to be in control so as they do not get out of topic. If done properly students will learn how to take turns when discussing, learn how to listen attentively and most of all giving constructive feedback. (Sharples, 2015)

Incidental learning is learning that occurs without prior planning, this might occur incidentally whilst doing another task that is unrelated to that learning. This is done on a daily basis in a person's life through life experiences and through technology and it is a continuous process. On the other hand, there is context-based learning, this is learning by interpreting the information received based on the where and when it occurred. If the learning occurred in a classroom within a confined space it is one thing whilst if it occurs somewhere else, it is something else. The important thing that comes out from this is no matter where an individual like to learn just as long as the learning occurs.

Computational thinking is a powerful approach to thinking and problem solving, this is done by breaking large problems into simpler ones that can be tackled easier. These skills can be valuable in many aspects of life ranging from writing a recipe of a dish you created to organising a newly opened restaurant. The aim of all this is teaching students to structure problems making them easier to solve. (Sharples, 2015)

Learning by doing is where Vocation educational training (VET) comes in and what is mainly used by the author in his day do day job as a lecturer in a VET institution. Working hands on in a lab with real tools and producing goods enables students to be better motivated to learn and achieve always better. With the appropriate set of tools and professional understanding of the lecturer, this will offer students better understanding of theories explained in the classroom. A perfect example for this will be creating a link between the theory session about sugar alternatives and then during the practical session sugar alternatives will be used by students to produce pastry goods suitable for diabetics. In this case students will sometimes do mistakes however, through the right coaching by their lecturer they will be able to correct their mistakes with the result of an enriched learning. When someone makes a mistake and then that mistake is corrected with the right feedback, the learning will be more efficient in most cases. (Lucas, 2016)

According to Dweck she found out that learning by doing creates a “growth mindset” as it creates a passion for learning rather than hunger for approval. People learning by doing are not only discouraged by failure, but they don’t see themselves as failing in those situations, they see themselves as learning. Working hands on is encouraged and expected in order to achieve the appropriate knowledge base. (Dweck, 2015)

Embodied learning involves the individual’s awareness of the body interacting with the real or simulated world to support the learning. This is mainly used when learning sport or something that has to do with physical movement. Nowadays technology can help with monitoring this learning by wearing body sensors logging movement to a mobile device. Due that we are all humans with different needs and because most educational presentations are the same for all this creates learning difficulties for the learner to figure out how to engage with the content. Through this learner will start to get bored, others will be lost, and very few are likely to discover paths through the content that results in optimal learning. This is where adaptive learning comes in to solve this problem, using the learners previous and current teaching data to create a personal path through the learning content. This system will recommend the ideal stages to start a new content and when to review older content, using a selection of methods to monitor the student’s progress. Generally using computer guided support to reinforce the learning. (Sharples, 2015)

Analytics of emotions, this can be done by using technology to determine the non-cognitive element of the student using eye tracking and facial recognition to analyse how students learn better. In real classrooms this can be done by incorporating computer-based learning with highly trained and experienced teachers to reinforce the learner and learning in the best possible way. Stealth assessment is another modern way of pedagogy using technology to assess learning and teaching. This method borrows techniques from online role-playing games in which the system continuously collects data about the user’s actions and responses in order to give appropriate new challenges. This method of embedding assessment into a stimulated learning environment is now being extended in schools and also used in adult learning. Research claims that this method can test hard-to-measure aspects of learning such as strategic thinking, creativity and perseverance. (Sharples, 2015)

3.1 Vocational Pedagogy

Vocational pedagogy is most of the time under researched, under theorised and seen as an inferior type of education compared to academic education, however it provides the society with the required skilled persons to offer their services. Below is a figure of the steps

that should be taken before planning or designing any course in VET. With the below diagram in mind one will be able to design a better end product.

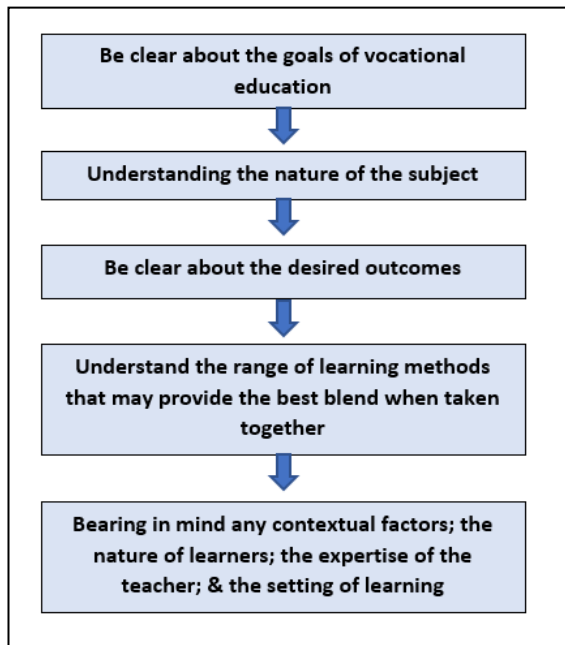


Figure 3. Points to consider when designing VET course. (Lucas, 2016)

As mentioned above Vocational pedagogy sums up all the different methods a vocational educator takes to deliver and teach vocational students in their particular line of field. Adjusting their approaches to meet the need of learners and matching the context in which they find themselves in. Vocational education is a very vast subject as different skills require different teaching methods to be used in delivering the right material. Similarly, effective teachers draw a long list of teaching methods and then choosing what will work best in the particular scenario being taught, adapting to the context in which students are learning and adapting to the needs of their students.

Very often vocational educators use a narrow range of methods to teach the required skills however, research shows that there are a lot of different methods that can be used. Whether or not the students reached the desired learning outcomes depends on the selection of teaching methods used. The below list is indicative of the vocational teaching methods with considerable value for teaching. Most of them use the learning by doing approach through a combination of reflection, feedback and theory. (Lucas, 2016)

Table 7. Vocational learning methods. (Lucas, 2016)

- Learning by watching
- Learning by imitating
- Learning by practising ('trial and error')
- Learning through feedback
- Learning through conversation
- Learning by teaching and helping
- Learning by real-world problem-solving
- Learning through enquiry
- Learning by thinking critically and producing knowledge.
- Learning by listening, transcribing and remembering
- Learning by drafting and sketching
- Learning by reflecting
- Learning on the fly (on the job learning)
- Learning by being coached
- Learning by competing
- Learning through virtual environments
- Learning through simulation and role play

Context is extremely important in vocational education as learning something at school in a class workshop is completely different from learning something on the place of work whilst working continuously under supervision of the supervisor. However, although they are completely different, they need to work hand in hand together to support each other and create better employees for the industry itself. Industry needs to support and state what their needs will be in the future so vocational institutions can supply the required work for future employment. If this alignment is not present, there will be a whole confusion for students leading to a lot of failures along the process. Vocational teaching is a series of choices that need to be taken by educators in regard to the learning methods. These choices will affect the quality of learning and ultimately the quality of the country's workforce in the future therefore, choices need to be taken seriously and in conjunction to what the industry needs. (Lucas, 2016)

3.2 Employee training

Training employees is not a one size fits all strategy and has to be taken in the particular context it is being used in. Therefore, building a good employee training programme is not a straightforward task. In this section the author will be analysing some characteristics of how a good and successful a training programme can be done.

First of all, when designing a training programme, it all starts with a person, whether it is the training manager, supervisor or a sub contracted person to deliver the training. Regardless who the person is the most important thing is whoever is delivering can deliver

the gap identified in the company. Such people need to be open minded and constantly on the look to innovate and bring changes where required. Following the first step this person engaged to do staff training is to assess what needs there is in the company that needs training to fulfil them. Needs can be found either in the company mission and vision statements or by surveying employees at work, looking for gaps in the system, this is referred to as a “training need”. At the core of an effective training programme is the identifying who needs to be trained and on what skills and topics they need to be trained. Once the needs have been identified they need to be aligned to the company’s initiatives, therefore see that the gap found is in line with what the company needs. This will get employees more likely to understand the training and managers and supervisors will support this training. Nobody will want to do something just because they are told to do so there must be a purpose behind it all to be effective. (Kluczny, 2019)

Outcomes of training programmes are difficult to quantify. However, when identifying the company needs that are aligned with the strategy quantifying becomes much easier. When the goals for training are developed, they must be developed in a way that they can be measured along the process and also after the process. Another crucial point in staff training is persuading the leaders that employees need training. As soon as a training manager manages to persuade the leader of the need of training that persuasion will be passed on to his subordinates and training will be more effective as it is owned by one of them. Creating content that is relevant to the needs of the staff being trained is crucial in a successful training program. The content delivered must be applicable to their daily routines and delivered in a timely manner providing them with quick takeaways that can be immediately applied on the job. Being creative is also very important when delivering training as generally it will engage employees better than doing training in the same old way. Adding a mascot or branding the training can lead to more fun and familiarity as the training continues. Marketing and communication are an integral part of every training program. Therefore, when marketing a training program to employees it is extremely important to clearly state why the training program is important for the individual and for the company. This will give a better sense of belonging to training and will enable employees to be more motivated through the training. The last step of all this process is the post training reinforcement, it is useless training employees if that training is not actually being utilised by the company itself. Studies shown that if training is not practiced straight away at work on a daily basis it will be forgotten within a week. Companies can also use other ways how to reinforce their training programmes like for example by putting pictures around the place of work to increase more awareness about the subject. (Kluczny, 2019)

It is useless for a company to spend a lot of money on nonsense training to employees as this will frustrate employees with extra work that nobody will benefit off. Following the above steps is extremely important when designing a staff training program in order to be successful and give the required results.

4 Quantitative surveys for chefs

The main objective of this thesis is to improve the level of knowledge and skills amongst people working in the industry to cater for diabetics in the right way. This will be done by creating a short practical course to cook and serve suitable dishes for diabetics. Whilst to accompany the main objective the author did another three sub objectives:

- Determine whether there is enough knowledge amongst chefs working in the local industry how to cater for diabetics
- What are the requirements to create a practical short course for chefs working in the industry in Malta?
- Creating a scheme of work of all the practical recipes together with the recipes to be used for the course. Analyzing the recipes making sure they are good and healthy for diabetics.

Following the finalisation of the literature review the author had a meeting with the tutor on what kind of research methodology is best suited for this thesis. It was agreed that the best way was to use quantitative research method as to reach a considerable number of people and getting their feedback on the subject. The target audience selected is chefs as the final aim of this thesis is to design a course to train them on how to cater for diabetics therefore their say in the designing of this course is highly important for the author. The main aim of this questionnaire was to determine the level of knowledge and interest on diabetes from local chefs. The author wanted to also get feedback from chefs on how they would like this module to be delivered and what topics should be covered through it. Following the guidelines of the literature review and keeping in mind the aim and objectives of the thesis, the author drafted a list of eleven questions with their justification and sent them to the tutor for vetting. After vetting the author did the necessary arrangements and compiled the questionnaire online using the Webropol online survey tool. This was an easy task for the author as it was not the first time using this platform for surveys. After completing the survey, it was sent to five people to pilot the questions to which the author had a lot of feedback from all the participants. Following the feedback given from pilot participants some questions were modified, one question was removed, and another two questions were added to the survey according to recommendations. After finalising the questions, the author tested the questionnaire on the online system himself to check that everything was working the way it should be. Being that the crowd that needed to respond to the questionnaire were chefs and the author is a chef himself, he's got contacts for this. Questionnaire was sent to current chef colleagues at the Institute of Tourism Studies via e-mail to which the author got 56% responses from them amounting to fifteen responses. The rest of the questionnaire were sent via a web link using social media to

professional chefs working in the industry to which the author got 45% response amounting to fifty-five respondents. This gives a total of seventy responses, after consulting with the tutor the author closed the survey as they were both satisfied with the feedback provided.

The survey was made of thirteen questions in total having the first two questions to build a profile of the respondent and the rest of the questions related directly to achieve information regarding the aim & objectives of the thesis, a copy of the questionnaire template can be found in the appendices section as appendix 1.

In the sub chapter below, you will be able to find the questions used for the questionnaire together with the justification for those questions and a detailed analysis of the findings.

4.1 Questionnaire results

The first question was to ask participants on the number of years they have been working in the industry. This will help the author determine the number of years the participants have worked in the industry therefore their level of experience and knowledge within the field. Most of the participants with fourteen out of seventy persons had between four to six years' experience. Followed by twelve out of seventy persons having between seven to nine years and eleven persons with more than twenty-six years of experience up their sleeve in the industry, of which 2 of them worked in the industry for fourth years. For the author this will give quite a clear picture of the whole spectrum of all ages and different generations of chefs working in the industry. These findings will give a clear idea of the level of motivation across all age gaps of persons working in the industry.

The second question asked participants what their role and position within the company is. This gave a better insight on the level of responsibilities that the participants of the survey have in their respective kitchens. Options provided for respondent to choose from where Head chef, Pastry chef, Sous Chef, Chef de Partie, Commis Chef & Others. From these participants the author decided that it was best to sum up all the categories into two main ones mainly being managerial roles ranging from head chef, pastry chef, sous chef, chef tournant and chef lecturers. The other category is composed of non-managerial roles namely consisting of chef de partie, demi chef de partie and commis chefs. Forty-six out of seventy participants are working in a managerial role whilst the other twenty-four participants are working in a non-managerial role. Although the largest percentage of the participants are in decision making roles and take care of the establishments, there is still a considerable representation of the lower positions in the kitchen. This response shows that although most of the respondents are working in a managerial role with more knowledge there is still a substantial representation from non-managerial roles.

This question was asked to determine the level of knowledge of the participants on diabetes condition. This was done by using a numbered scale with a scale of one to five with one being the most knowledgeable and 5 being the least. As expected by the author only seven out of seventy respondents selected one being that they are knowledgeable about the condition. Most participants chose number three being the mid-range number with thirty-one out of seventy respondents, followed by number four showing that they have lesser knowledge with twenty out of seventy respondents. This further continues to clearly identify the need there is in the industry to do this course. Increasing more awareness and educating chefs how to cater for this continuously growing condition on the island.

Table 8. Table representing responses for question four.

What is your level of knowledge with regards to cooking for diabetics? (Rank your level of knowledge 1 being most knowledgeable and 5 being the least)	
Total respondents 70	
Knowledge Scale	No. Of Responses out of 70
1 Knowledgeable about diabetes	5 Chefs
2	8 Chefs
3 Mid-range knowledge	31 Chefs
4	20 Chefs
5 No knowledge about the condition	6 Chefs

The question was an open-ended text question to verify response given in the previous question. Comments received result with more or less the same results of question three however, comments were more meaningful. Nine comments showed that participants were more knowledgeable about the subject mainly because they either are diabetics themselves or have a family member with this condition. One person in particular stated the following, *“Since I’m a pastry chef I encounter a lot of dietaries specifications in which one of the most common is about diabetics, so I had to readjust quit a few recipes”*. This clearly shows the high level of demand there is in the industry for diabetic safe food. The rest of the other comments stated that they either have limited knowledge or no knowledge at all. What is worrying is that some comments stated that being diabetic all you need to do is eliminate sugars only, which is definitely not the case as carbohydrates, saturated fats and Trans fats can be equally dangerous. Another particular comment that struck the author is, *“My knowledge regarding question No. 3 is in the middle because in today life always need to keep yourself updated with the latest information and never say I know everything.”* This shows that no matter how much experience one might have there

is always something new to learn, this shows the will there is to learn amongst chefs working in the industry.

The next question asked the participants whether they think that having a trained person to cook for diabetics in every establishment should be enforced by law. This question was suggested by one of the persons that piloted the questionnaire prior to being distributed. It was inserted to the survey as the author thought it will be good to determine the importance given towards this condition by chefs. If a chef states that it needs to be compulsory by law therefore for him/her personally it is extremely important. To this question seventeen out of seventy respondents said that they strongly agree, twenty-nine respondents that they agree, and twenty-one respondents said that neither agree nor disagree. Only three respondents said that they disagree and strongly disagree. Once again this shows that people in the industry believe that catering for diabetics cannot be taken for granted and that they want to give it the necessary importance in their establishments.

This question was a simple yes or no question to determine whether the respondents have the knowledge about carbohydrate counting. Being a yes or no question it could be that even if a person heard once about it, he/she might still remember about it and will respond yes to the question. Forty-eight out of seventy respondents said that they know what it is whilst the other twenty-two said that they have no knowledge on carb counting.

This question was given to determine the frequency of requests by diabetic people in restaurants. To the author's surprise twenty-nine out of seventy respondents said they get these requests once a month. Five respondents said they get these requests on a daily basis, and nine respondents said they get these requests once a week. This surprised the author since the number of people suffering from this condition in Malta is quite high. When the author discussed this with family members and colleagues suffering from this condition their answer was that most diabetics do not request anything special in restaurants. They generally calculate themselves how much carbs there is in a meal this is due to the lack of knowledge there is in the industry it will be useless requesting. When it comes to dessert whenever they asked, they will be presented with fresh fruit, so most diabetics will just opt out of taking any dessert whatsoever.

This question was intended to determine chefs response when getting requests by clients for specific diabetic requirements. Chefs working in the industry have basic knowledge about diabetes diet however most of them will revert to the clients when such requests are done, as depicted in the below word cloud in figure four. Basically, putting the responsibil-

ity on the client on choosing what they will be eating. This also shows the lack of confidence there is amongst chefs when cooking for this condition since they need to ask the client. One particular positive respondent's comment struck the attention of the author, being an owner of an artisanal gelateria the respondent said the following; "I have eight different gelato flavours in my counter made with no added sugar, this means that 20% of my gelato selection is purposely made without sugar" this shows that there are people who are seriously catering for diabetic needs as a norm and not on special requests. Below is a word cloud done by the author to represent the main points coming out from this question.



Figure 4. Word cloud representing how chefs cater for diabetic food requests by patrons.

The above diagram clearly illustrates that most chefs will seek advice by the clients themselves on what to cook for them (28 out of 70), followed by reducing or avoiding the use of sugars (15 out of 70) and carbohydrates (16 out of 70) in cooking for these persons. Saturated fats were not mentioned by anybody showing there is a blank in the level of knowledge of chefs. Fourteen out of seventy chefs also said that they get their knowledge by searching online, this can be a bit misleading as if the information is gathered from unreliable sources it can lead to misinformed decisions. Eight chefs said that it is recommended to pre book if a person is to go dining out, the author believes that this is highly discriminatory since diabetics need to be treated as normal guests and not as if they are asking for something exceptional.

This question was asked to determine how prospective participants will want the course to be delivered. Options provided were hands on cooking sessions, cooking demonstrations by lecturer, a mixture of both hands-on and cooking demonstrations, theory only and other. In the below report the author summed up the other comments with the rest of the other options as the where the same. Fifty out of seventy participants responded that they would prefer a mixture of hands-on cooking sessions and demonstration by the lecturer. This shows that it's extremely important to deliver the course with a hands-on approach. On the other hand, only eight out of seventy participants selected the theory only approach therefore, the plan of the author was a mutual agreement that being a vocational training institution for chefs the approach must be mixed having all the elements supporting each other. The below chart will give a detailed visualisation of what the participants selected in their answers clearly stating that a hands-on approach needs to be adapted in this context.

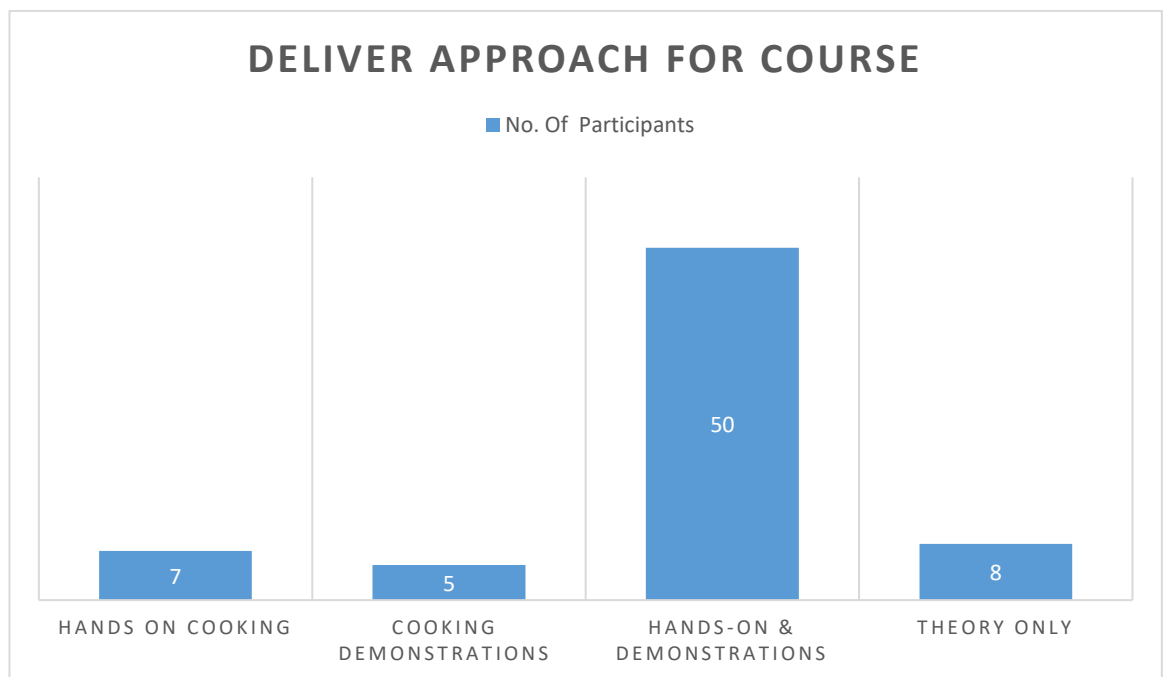


Figure 5. Preferred deliver approach for the course.

This question was asked to determine how much time chefs are determined to dedicate towards this course. This will give the author a clear indication of the total time and number of sessions for the course. The choices provided were eight hours, sixteen hours, twenty-four hours and others. The results of this question were quite close with the highest percentage stating that it should be eight hours with twenty-four participants followed

by sixteen hours with twenty-three responses and the least popular option was twenty-four hours with twenty responses. This shows that participants are willing to give some of their valuable time to learn more about this condition. The author will try to reach a compromise between the sixteen and twenty-four hours which will give enough time for course material to be covered without requesting a lot of time from the participants. The below chart illustrates the finding in more detail.

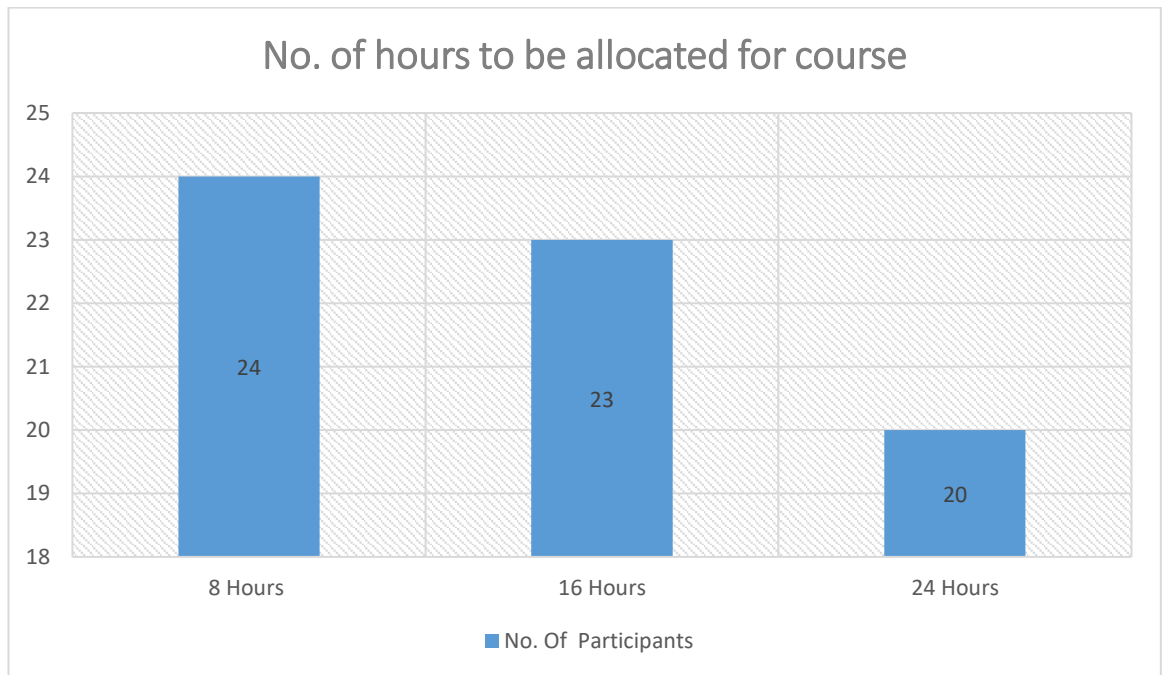


Figure 6. Preferred duration of the course.

This question was asked to determine what topics participants would like to cover through the course, whether just pastry or a mixture of pastry and savoury. The answer for this question was quite clear with thirty-nine out of seventy respondents selecting that it should be a mixture of both savoury and pastry items. Another twenty-two participants selected a mixture consisting of 60% pastry and 40% savoury items to be taught during the course. Only 3 respondents said that it should only be pastry related and six respondents said it

should be 60% savoury and 40% pastry. This shows a high level of interest from the majority of the people working in the industry, the interest is not only coming from persons working in the pastry but also chefs working in the kitchens and head chefs, to further continue widening their knowledge and hence be able to serve their customers better. The below chart depicts the way that respondents replied to this question in a visual way.

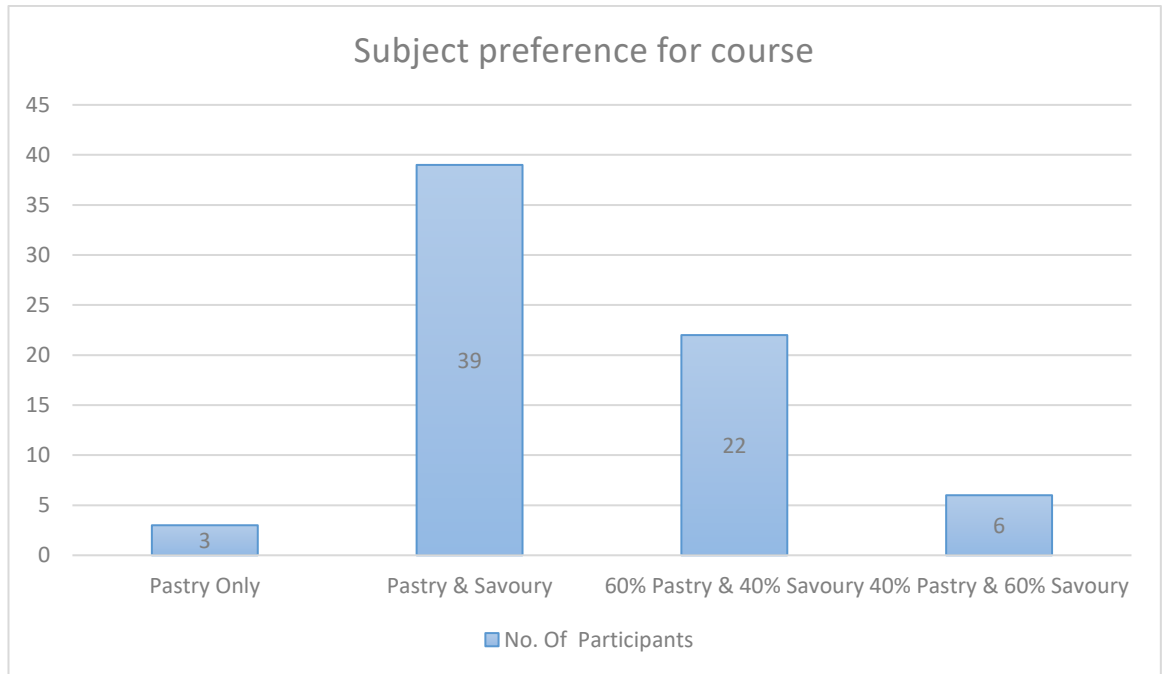


Figure 7. Subject preference for course

This question was asked to determine whether participants coming from a skilled place of work consider theory as equally important to the actual skill itself. To the author's surprise fifty-five out of seventy respondents said yes. Whilst the other fourteen said yes but should be delivered during the practical class. Only one respondent said that it does not make a difference whether there will be theory sessions, and nobody said that theory shouldn't be included in the course. Yet again this further continued to support the author's taught that theory is a crucial part of any course however, there must be a clear and visible link with the practical session. If there is a clear link between theory and practical's the learning will be more efficient.

The last question of the questionnaire was an open-ended question so that participants can give any extra feedback they deem right and beneficial for the course to be successful. Below is a word cloud representing the common responses for this question.



Figure 8. Word cloud for question thirteen of questionnaire

As can be seen from the above figure most of the respondents thought that this course is very important for the industry and is a very interesting topic to learn about. A lot of respondents also mentioned that knowledge is extremely important for everyone. This course can act as a refresher for chefs with basic knowledge and as a course for chefs who have no idea about the subject. Ten respondents also said that this course should be combined with other conditions such as allergies to have more information about topics that are continuously being requested in the industry. Someone suggested that such course should also be provided for front of house personnel so they will learn how they can handle these kinds of requests. Someone suggested that on one of the sessions a diabetic person should be brought to class to give a first-hand experience about the condition and the discomfort endured when dining out. Two respondents suggested that this course should be compulsory to ITS students as they will be tomorrow's chef thus preparing them for the future. Another participant stated that this course should be created and started being delivered as soon as possible at the institute. At the end of the course students will be able to create a new and creative dish to cater for a diabetic person this is what another respondent suggested. Another respondent with an academic background and being a diabetic himself suggested a sample scheme of work that can be utilised for this course. All the above comments and feedback further continued to show the level of interest there is in the industry for any type of knowledge which will help the industry to serve their customers in a better way.

After collecting all the data provided through the questionnaire responses, reviewed and analysed all the information provided the author is now in a more informed position to create this course for chefs. The next step is to start designing the required course and related material to deliver this highly desired course for the industry.

5 Course designing

As mentioned in the literature review chapter 3.1 the author will be using figure nine attached below to help him develop a better end product for prospective students of this course. The information to fill in all the five sections will be coming from either the literature review or the findings of the questionnaires.

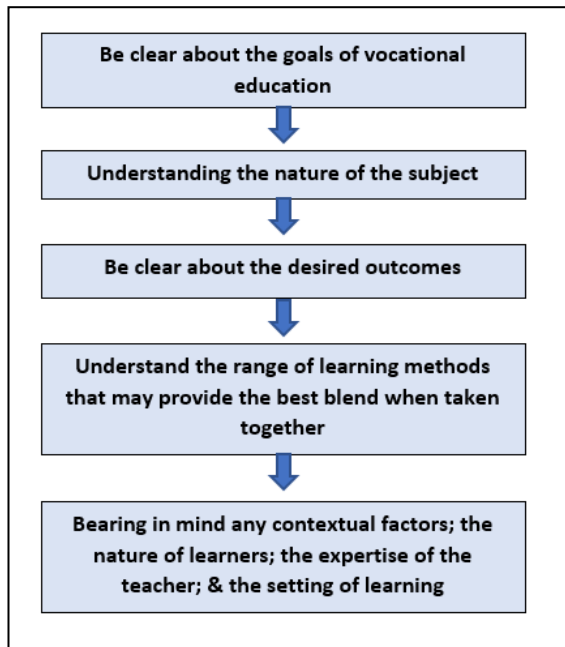


Figure 9. Points to consider when designing VET course. (Lucas, 2016)

5.1 “Diabetes course for Chefs” design steps

Be clear about the goals of the vocational education:

The main aim and objective of this course is to improve the level of knowledge and skills amongst people working in the industry to cater for diabetics in the right way. To support this main aim the author is using the following sub objectives; To deliver sound knowledge to prospective students about the diabetes condition. Knowledge to be given is about the condition in general, foods that should be avoided, safe foods, carb counting and recipe modification to make them suitable for diabetics. Using a testimonial of a diabetic person to support learning amongst chefs. Allocate 60% of the course to be pastry related and 40% of the course to be kitchen (savory) related as per responses of the questionnaire. Interlinking theory to the practical sessions to facilitate learning. However, the ultimate goal of this course is that at the end of it every participant should be able to create a safe dish for a diabetic person.

Understanding the nature of the subject. (diabetes condition)

First of all, the author himself needed to get his own knowledge about the diabetes condition which was done through the literature review of this thesis. Following this the author will design a scheme of work that needs to be followed and then theory and practical sessions will be designed and planned accordingly. The knowledge learned will be passed on to prospective students of this course. The author also intends to get a diabetic person and explain a bit more in detail about the condition at first hand for the first session. This way chefs will get to get a first-hand experience from the diabetic. As a lecturer delivering any subject, he/she must be extremely prepared by knowing thoroughly about the subject being taught as you never know what level of knowledge the chefs might have. This will also give more confidence when delivering the content of the course. As seen in the previous section of the thesis prospective students (chefs) might have some knowledge about how to cook for diabetics therefore this must be kept in mind when designing the content of the course. Further to this, being that they are all professionals working within the industry they will have the required skills and knowledge about cooking therefore more information can be delivered during practical sessions when compared to a person that does not know anything in the kitchen.

Be clear about the desired outcomes.

This is highly important in any educational context however in vocational education it is more important. The learning outcomes have to be clearly stated as soon as the course is being designed and drafted. In this context the author will do a Module Descriptor using the ITS template. Prospective chef students will be able to check this module descriptor online before enrolling to the course, this way they will know what the outcome of this course will be. The main outcome being to be able to cater safely for a diabetic person.

Understand the range of learning methods that may provide the best blend when taken together.

This question was given to the respondents of the survey to which they decided that there should be a mixture of demonstrations by the lecturer followed by hands on practical sessions by the participants themselves. All this to be supported with theory sessions prior to the practical class and theory should be about the same subject that will be covered during the practical. This linking of the theory with the practical will lead to better learning by the participants. With regards to timing for the classes the author used the recommendations from the survey to come up with the time frame for this course with a total duration of twenty hours 4 sessions with 5 hours each. Each session will be divided into two the first hour being theory followed by 4 hours practical session.

Bearing in mind any contextual factors such as the nature of the learners, the expertise of the teacher and the setting of the learning.

This course will be delivered to chefs working in the industry with mixed abilities and past years of experience therefore in the practical sessions it should not be an issue as they will all have the basic knowledge and can follow recipes easily and fast. Therefore, a lot of material can be covered within a short time frame during the practical class. On the other hand, theory has to be delivered in an interesting way to be able to retain the attention of all the participants. The author strongly believes from past experience that it is actually better to spend a bit less time in the theory class and a bit more time explaining the theory behind a particular choice or task during the practical class. As this kind of learning will generally be more effective especially when having mature students. Again, since students for this course will be mature and they will be there because they really want to, they will be highly motivated to learn and acquire more knowledge.

The author and prospective lecturer of this course will have to continue widening his knowledge about the subject in order to be fluent in the topic. The literature review alone will give extensive knowledge however there needs to be further studies in this regard in the future.

With regards to premises and facilities this should not be an issue at the institute as there are different fully equipped kitchens that can be used for the purpose. The author intends to use the red kitchen as it is purposely built with individual workstations and a demonstration area. The equipment in it is suitable for both kitchen and pastry, adjacent to it there is a theory class that can be used as well. Therefore, this is the most ideal kitchen to be used for this catering for diabetic's course.

5.2 Module descriptor

A module is a self-contained, individual unit of study that can either be delivered by itself as a part-time course or being part of a larger study programme (as part of a full-time programme of study delivered at the institute). The module descriptor provides various details about the module including who the module tutor is, what a prospective student will be studying through the course including the knowledge, skills and competences that will be acquired at the end of the course. Modes of assessment will also be part of a module descriptor; this will show prospective students how they will determine what they learned once completing the module.

After using the template of how to design a vocational course in section 5.1, the author did a module descriptor for this course using the template provided by the Institute of Tourism Studies. All the information inserted in the descriptor is coming from the literature review and the survey findings. The module descriptor can be found attached as appendix 2 of this document.

In the beginning of the descriptor one will find the overall objective of the course *“to improve the level of knowledge and skills amongst chefs working in the industry to cater for diabetics in the right way”* this will create a sense of interest about the subject to prospective students. Following this there is a whole list of knowledge skills and competences that a prospective student will be acquiring through this course. All this information was gathered mainly through the literature review and also from some of the responses in the questionnaire. This will give a clear indication of all the material that will be delivered during the course. The next section is about the contact hours that this course will have, as mentioned earlier and as requested by participants of the questionnaire the total no of contact hours will be 20 hours. The next part is relating to teaching method to be used, yet again this was a question asked in the survey where participants selected that a hands-on approach has to be used and that it has to be content centred by linking theory concepts to practical sessions. The last section of the descriptor is about the assessment methods to be used; this will determine whether the learning has been achieved by all the participants. To which the author selected to allocate a multiple-choice test to be given in class during the last session and an assignment being that they need to modify 2 recipes of choice to make them suitable for diabetics.

Going through the all the above information provided on the module descriptor prospective students will be able to do a more informed decision when applying for the course.

5.2.1 Scheme of work

Following the module descriptor attached in appendix 2 the author was in a position to design the scheme of work for both theory and practical sessions. A scheme of work is a detailed list of all the topics that will be covered in every session through the course. The below table no. 12 is the scheme of work that will be used for this course. The author tried to put in as much information into the restricted time frame that the participants selected in the survey. Although time is quite restricted however the author believes it will give clear basic knowhow about the condition and chefs will be able to create and amend dishes for diabetic customers in the restaurants. The author selected to distribute the twenty hours of contact to be distributed on four sessions of 5 hours each. The author then further subdivided the sessions into theory and practical sessions according to the needs of the material that needs to be delivered. The most important point to the author is that he relates the theory sessions with what will be done in the kitchen. the author also kept in mind that the participants of the survey stated that the course should be comprised of 40% material related to savoury work and 60% related to sweets.

For the first session the author allocated a two-hour theory session about the condition in general a testimonial by a diabetic person, explanation of the dietary restrictions and the effect of saturated vs unsaturated fats for a diabetic person. Following this, students in the kitchen will do 2 bread recipes, namely oatmeal bread and whole wheat Bulgar bread, a modified shortcrust pastry and ricotta filling for the pie. The second session is about carbohydrates and carbohydrate counting with one hour allocated to theory followed by four hours practical session. During the second practical session students will be preparing a modified fresh pasta dough and a gluten free pasta dough with a chicken pesto sauce to accompany it followed with a modified sweet pastry recipe and pastry cream to assemble fresh fruit tarts. The third session during the one-hour session glucose and sugar alternatives and suitable fresh and dried fruits. This will be followed with a four-hour practical session covering a tiramisu recipe, a carrot cake including cream cheese frosting and a raspberry parfait. For the last session during the one-hour theory sessions dairy based desserts and recipe modification will be covered, followed by thirty minutes to do the multiple-choice test as specified in the scheme of work. During this theory session the lecturer will also explain what needs to be done for the assignment they have about recipe modification. During the three-and-a-half-hour practical session the following recipes will be covered; baked lime cheesecake and a chocolate and peanut butter brownie served with vanilla ice cream.

Table 9. Theory and Practical scheme of work to be used for course

Session No.	Topics to be covered during theory	No. of hrs Theory	Topics to be covered during practical	No. of hrs Practical
1	Introduction to the course Diabetic person testimonial Dietary restrictions Saturated vs unsaturated fats	2hrs	Whole wheat Bulgar bread Oatmeal bread Short crust pastry modified Ricotta pie	3hrs
2	Carbohydrate replacements Carbohydrate counting	1hr	Pasta dough (1 modified, 1 gluten free) Fettucine chicken and pesto Sweet pastry Pastry cream (fruit tartlets)	4hrs
3	Glucose and sugar alternatives Suitable fruit and dried fruit	1hr	Raspberry parfait Carrot cake (cream cheese frosting) Tiramisu Sponge fingers	4hrs
4	Dairy based desserts Recipe modification Test (30min)	1.5hr	Vanilla ice cream Baked lime cheesecake Chocolate & Peanut butter brownie.	3.5hrs

5.3 Diabetic Recipes for course.

Finding the right recipes for this course was quiet challenging as being a course intended to be delivered to chefs' tasks need to be interesting and motivating for them. With the time restriction as imposed to the author via the questionnaire, however when looking at the whole module it looks quite balanced and interesting. Although there seems to be a lot of work that needs to be covered within each practical session. However, the author strongly believes that being professional chefs all the material will be covered in each session without any problems. Respondents to the questionnaire also suggested that 60% of the course should be pastry related whilst the other 40% should be kitchen related. That is why the author did 1.5 lessons dedicated to the kitchen and 2.5 lessons dedicated to pastry recipes. The recipes used for this course are a mixture of modified normal recipes to be suitable for diabetics and recipes that are intended for diabetics. Although flavour and texture might not be the same as other recipes however diabetics will be able to enjoy

something good without any risks. The recipes chosen were based on the likes of the local customers. Being that the author has been working in the industry for some time he knows what is popular and what is not amongst local people.

For the first lesson the author did two bread dough recipes; oatmeal bread and whole wheat Bulgar bread. Both are highly nutritious with reduced carbohydrates; they are both quiet heavy breads therefore just one slice will be more than enough for a person. The other task that will be done in the first practical session is a ricotta pie using short crust pastry suitable for diabetics. Instead of butter canola oil is being used as it is very low in saturated fats with only seven percent. There is a mixture of whole meal flour and strong flour this will make carbohydrates act slower on the body, whilst the lemon juice will give flavour and elasticity to the dough. As for the filling of the pie the content of the grated cheese was reduced to reduce some of saturated fats and using ricotta which is very low in fats. The recipes for lesson one can be found in appendix four.

For the second lesson the author dedicated half the lesson for a savour dish and the other half for a sweet dish. The savoury dish that will be prepared is plate of home-made pasta including the pasta dough. The author did 2 pasta dough recipes the first one being a gluten free pasta dough with xanthan gum added to it to compensate for the elasticity normally provided by the gluten. Whilst the other dough is a normal dough with more whole meal flour and using canola oil instead of olive oil. To accompany this the author did a recipe for a simple but tasty and healthy sauce, Chicken, broccoli, peas and pesto sauce. The fresh pasta will be cut into fettucine and cooked together with the sauce. Participants in the course will be able to do both pasta doughs, this will give them more knowledge. The other task is a simple fruit tartlet, although it is simple however both components in it can be used in various other recipes. The sweet pastry is gluten free using almond and coconut flour and using stevia as a sweetener. For the sweet pastry butter was substituted with olive oil. With regards to the pastry cream most of the milk used is coconut milk and the thickening agent used is arrowroot instead of wheat flour. To this a list of fruit that has a low glycemia index was provided to participants as not all fruit is suitable for diabetics. Recipes for lesson two can be found in appendix five.

For the third lesson did three desserts composed of a total of five recipes. The first recipe is a raspberry parfait using plain non-fat yogurt and raspberry puree as a base and aerated with whipped egg whites rather than as normally done with double cream. Egg yolks have also been omitted from this recipe. The parfait can either be served frozen as a replacement for ice cream or also as a mousse from the refrigerator. The recipe can be

amended with any fruit puree suitable for the customer's likes making it also very versatile. The second dessert is a carrot cake which has been modified to make it suitable for the condition. The number of whole eggs has been reduced and replaced with egg whites, vegetable oil and reduced fat margarine are being used and with reduced quantities and instead of sugar honey is being used in this recipe to give the sweetness. As for the cream cheese frosting the butter is completely removed from the recipe and using low fat cream cheese instead of the normal one. The author is also using sweetener instead of icing sugar for the frosting. The last dessert for the third lesson is the tiramisu. The sponge fingers recipe has been modified by substituting the sugar with sweetener and substituting 50% of the flour with wholemeal flour. As for the filling it is completely different from the classical recipe due to fat reduction in the recipe. Ricotta cheese is used instead of the mascarpone, egg yolks are reduced drastically, and the aeration of the mousse is achieved through the whipped egg whites rather than with double cream. When the author tried this recipe as it looked quite odd to him, he concluded that although it is nothing compared to the classical recipe however, the flavour and texture of the mousse are quite good as well. Recipes for lesson three can be found in appendix six.

For the fourth and last lesson of the course the author did another two desserts composed of three recipes. The first recipe is a baked lime cheesecake. For the crust the author used the graham crackers rather than the normally used sweetened biscuits and reduced fat margarine to combine the crust instead of normal butter. For the cheesecake mixture the modifications were that low-fat cream cheese has been used, reduced the egg yolks and substituted them with whole eggs and using sweetener instead of sugar. Once again, this recipe can be modified with different flavours according to the customer likes. The second dessert is a chocolate and peanut butter brownie that can be served warm with a scoop of vanilla ice cream. For the brownie recipe the author used low fat margarine and canola oil as a substitute for butter, instead of using melting chocolate he used cocoa powder as it does not have any additional fats and sugars added to it, the flour used to bind the brownie is also whole meal which will release glucose slower in the blood stream. As for the ice cream egg yolks have been reduced and some fat necessary to make ice cream is obtained from the evaporated milk. Fructose is being used in this recipe instead of the normal sugar. Recipes for lesson four can be found in appendix seven.

As can be seen from above the course is quite balanced with different recipes that can be amended or changed slightly with different flavours to accommodate customer likes. All recipes have been amended by reducing and changing sugars that are suitable for the diabetics. Saturated fats have been removed and substituted with reduced quantities of un-

saturated fats that are healthier for this condition. White wheat grains have also been removed where possible and substituted with whole wheat to have higher percentage of fibres. All these modifications make these recipes safer for diabetics. The author also worked out the nutritional content of each recipe and included them in the recipe sheet. This also gives a clearer idea of the content of the food to both chefs preparing it and can also be shown to the clients themselves. These nutrition content tables were done using a mobile application called Recipe IQ. Whereby all that needs to be done is take a picture of any recipe that needs to be calculated, give out the number of portions that recipe yields. Following that any clarifications with regards to the ingredients are done and then it will give out the nutritional content automatically.

5.4 Course material feedback.

Being that the author was not able to try out the course due to the current situation it was suggested to him to get some feedback on the material created for the course. To this the author got feedback from a member of the top management at the institute, four chefs working in the industry and a diabetic person.

The manager pointed out some small mistakes with regards to the module descriptor to which the author did the necessary arrangements to rectify them. With the mentioned amendments the module descriptor will be sent to the Malta Qualifications Framework for their approval, making this an officially recognised course both locally and internationally. He also said that he is looking forward to seeing this course materialise itself in the near future as there is huge potential to it.

The diabetic person also praised the work done and said that the recipes are suitable for diabetics insisting that emphasis should be made throughout the course on the sugar and starch alternatives for their needs.

With regards to the chefs the Author chose them on purpose, all of them were involved in the survey therefore they had an idea about the course. One of them was a chef working in the industry, the other participant was a chef lecturer working at the institute with a thirty-year career behind him. The other two chefs chosen were both established pâtissiers on the island. This gave the author good feedback from different angles of the industry.

Overall, they all had very positive feedback on the material done by the author. One suggested that nutritional content tables were highly important as if the clients ask for the exact nutritional content of a recipe the chef will be able to give the necessary information. He also suggested that assessment modes should be split with thirty percent test and sev-

enty percent assignment rather than the fifty percent test and fifty percent assignment approach as proposed by the author. The author took note of this and realised that it makes more sense therefore the necessary changes were made as the assignment will be given more weight. The seventy percent weight for the assignment will require more work and to this the author came up with the following idea. For their assignment chefs are to modify two recipes of their choice, to add more weight to it the chefs will be requested to try these recipes at their workplace and attach a picture of their work. Concluding his feedback by saying that he hopes that this course will materialise itself at the institute as it will be highly beneficial for the industry.

The other chef working in the industry had high comments of praise about the material covered and said that he will be highly interested to apply for this course in the future. He would like to better understand the concept behind carbohydrates and their effect on the blood glucose levels. He also suggested that in the theory there should be a clear distinction between type 1 and type 2 diabetes. Food labels were also mentioned by this chef stating that he proposes that during theory different food label symbols should be included like for example; low in sugar, no sugar, diabetic symbol and other symbols related to the condition.

One of the pâtissiers said that he was always scared about this condition however when going through the recipes provided by the author, he realised that with a little attention his team will be able to deliver a healthier alternative for this condition. He suggested that sugar alternatives were extremely important making sure that the sugars used in the recipes were available in the local market. Fruit was also something that the participant found interesting as not all fruit is suitable for diabetics. At the end he clearly stated that this will be an interesting course and the industry will benefit a lot from it as it will chefs more prepared for this condition on the island.

The other pâtissier said that he could not see any wrongdoing in the research carried out by the author and he is also looking forward to seeing it materialise itself at the institute. He suggested that maybe there can be a fruit-based ice cream recipe and maybe sugar pastry prepared with whole meal flour and yogurt. He was a bit sceptic about some recipes provided by the author and said that maybe some modifications might need to be done to them. In fact, the author intends to try out all the recipes once the current Covid-19 situation is all over. Necessary changes will be done before they are used by the participants of the course.

As also mentioned above the author received highly positive feedback about the diabetic course for chefs. This continued to encourage and motivate the author to make this work as it is required by the industry and also it will be also beneficiary for diabetics when dining out.

6 Discussion

The main aim of this thesis is to improve the level of knowledge on diabetes, amongst chefs working in the industry. This was done by creating a scheme of work and a set of recipes together with theory presentations to be used for this course. Although measuring knowledge in the industry is not something that could be measured easily. However, respondents to the questionnaire were enthusiastic about the possibility of doing this course. This shows that they are eager to improve their knowledge skills and competences on diabetes. Therefore, if this course is offered at the institute the author is positive that he will get a good response from stakeholders, resulting in improving the overall knowledge about this condition.

The first sub objective was to determine the current level of knowledge amongst chefs working in the industry on how to cater for diabetics. This information was obtained from the survey amongst chefs to which they responded that they had limited knowledge. Most chefs claimed that they most of the time they ask their respective clients what they would like to have. To the author this is quite unprofessional, if a chef has basic knowledge on how to cater for this condition, he/she will be able to give choices that are all suitable for a diabetic person.

The second sub objective was to determine the requirements to create such a course and this was achieved through the literature review part. To make this course future proof one has to use the latest of trends in pedagogy. The author found out this relevant information about modern pedagogy by Sharples (Sharples, 2015). Suggesting different pedagogy traits to which the author chose the learning by doing trait for the course he is doing. The other part that helped achieve this sub objective was about vocational pedagogy where the author found relevant by Bill Lukas giving a five-point diagram of how to plan design and implement a vocational course (Lucas, 2016). This diagram was used in designing the course from beginning to end.

Employee training was the last topic in the literature review as it is extremely important being that we are speaking of chefs working in the industry doing this training. As Kulczyk states in the literature review nobody does anything just for the fun of it (Kluczny, 2019). Therefore, employees need to be motivated to learn to do this course and material covered should also be motivating for all. With all the information in the literature review combined with the questionnaire findings, the author was able to develop all this information into a module descriptor. This will be used to show prospective students' what knowledge, skills and competences this course will give them when completing it.

The third and final sub objective of this thesis was to create a scheme of work with all the recipes to be used through the course plus analysing all recipes to make sure they are safe for diabetics. This was done following the five steps as suggested by Bill Lucas in the literature review (Lucas, 2016). To do this the author used the knowledge built throughout the literature review to compose a module descriptor with the requirements as requested by the participants of the questionnaire. Following the module descriptor, a scheme of work of recipes was done with recipes that are popular and requested by local market. After selecting the recipes, the author started amending the recipes according to M. Dansinger MD whereby he suggested alternative fats and sugars to be used making foods more suitable for diabetics (M Dansinger, 2018). Reducing carbohydrates in recipes was also done where possible to reduce the carbohydrate count in a meal as stated by Marion J. Franz in the literature review (Marion J. Franz, 2014). Following all this the author worked out the nutritional content of each recipe to further continue to confirm that recipes are suitable for diabetics.

Unfortunately, due to the current situation worldwide with the Covid 19 all schools in Malta were closed until the end of the academic year 2019/2020. Due to this the author was not be able to do a test run of the course and get feedback at first hand from chefs doing this course. This feedback would have given the author the chance to improve the course and get recommendations of what can be done to improve the overall content of the course. Hopefully with everything back to normal by the beginning of the next academic year the author will be able to start doing these short courses for chefs. The marketing and promotion will be done through the institute's web site and social media pages. Being that most hospitality personnel follow the Institute's Facebook page with more than sixteen thousand five hundred followers it will be the best platform to promote this course. The author also calculated the selling price of this course including all commodities at five hundred euros. Although it might seem expensive however this will give competitive advantage to the restaurants with chefs trained on cooking for this condition.

As mentioned in chapter 5.4 the author used the feedback provided to him by four chefs working in various sections of the catering industry, a member of the Institutes management and a diabetic person to amend some of the material of the course he created. Getting an external view to his material by professional personnel made the author realise and do minor changes as recommended by these people.

Coming from a hands-on industry writing is not one of the strongest points of the author therefore writing this thesis was quite a challenge for him. However, with the support of

the tutor the work was broken into smaller chunks that could be handled easier. The most difficult part of the thesis for the author was the literature review. With diabetes being a medical subject most of the information was too scientific so finding the right information was a bit challenging.

This was a completely new subject for the author and although he worked in the industry for more than twelve years the level of knowledge about diabetes was very limited. Looking back now at the end of all this work done through this thesis with all the information collected throughout this research, lead the author to feel more confident of how to deal with this condition and is now ready and willing to pass on his knowledge to other chefs.

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Appendices

Appendix 1.

Questionnaire Template:

A suitable Chef's course to cater for diabetic persons. What do you think?

Dear Chefs

I am currently doing my thesis for the Master's Degree in Hospitality management with Haaga Helia University of applied science in Finland. My thesis title is "Creating better knowledge and skills in the Maltese hospitality industry on how to cater for Diabetics". With your responses I will be able to design a course how to safely cater for diabetic persons within your catering establishments.

Whilst thanking you in advance for your support I look forward to getting your responses back.

Thanks a lot in advance.

Kind regards

Steve D'Anastasi

1. How long have you been working in the catering industry? *

- 1 to 3 Year
- 4 to 6 Years
- 7 to 9 Years
- 10 to 12 Years
- 13 to 15 Years
- 16 to 18 Years
- 19 to 21 Years
- 22 to 25 Years
- Others (please specify how many years)

2. What position do you occupy in the kitchen? *

- Head chef
- Pastry chef
- Sous chef
- Chef de partie

Commis chef

Other positions (please specify)

3. What is your level of knowledge with regard to cooking for diabetics?
(rank your level of knowledge 1 being most knowledgeable and 5 being the least) *

- 1
- 2
- 3
- 4
- 5

4. Can you explain in more detail your knowledge for the above question No. 3. *

*

5. Maltese law states that in each catering establishment there should be a qualified First Aider on duty. Should, having a person trained in cooking for diabetics be also compulsory by law? *

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

6. A diabetic person has to monitor carbohydrate consumption as too much carbs will increase their sugar levels. This is called carb counting. Do you have any knowledge about this? *

- Yes
- No

7. How often do you get requests in your restaurants to cook for diabetics? *

-
- Daily
 - Once a week
 - Twice a week
 - Once a month
 - Other frequencies

8. When you get these requests how do you usually cater for their needs? *

9. What kind of lesson delivery approach should be adopted for this course? *

- Hands on cooking sessions
- Cooking demonstrations by lecturer
- Mixture of both hands on & demonstrations
- Theory only
- Other suggestions

10. In your opinion how much time should this course consist of? (based on 4 hrs per session) *

- 8 Hours
- 16 Hours
- 24 Hours
- Other options (please specify)

11. Would you be interested in just pastry dishes of a mixture of both pastry and savoury items to be covered in the course? *

- Pastry only
- Pastry and savoury

-
- 60% pastry & 40% savoury
 - 60% savoury & 40% pastry
 - Other options (please specify)

12. Should theory sessions be part of the course? *

- Yes
- No
- No difference
- Should be delivered & incorporated in practical classes
- Other options (please specify)

13. 11. Would you like to add any more comments or feedback towards building this course? *

Appendix 2.

Module Descriptor:

1. Title of module	
Catering for diabetics (chef's course)	REV: A
2. Module code	
N/A	
3. Malta Qualifications Framework (MQF) level	
N/A	
4. Module objective	
To improve the level of knowledge and skills amongst chefs working in the industry to cater for diabetics in the right way	
5. Learning outcomes	
<i>5.1 Knowledge: – at the end of the module/unit the learner will have been exposed to the following:</i>	
<ul style="list-style-type: none"> • Diabetes condition in general • Diabetes dietary restrictions what can and what cannot be consumed • Carbohydrates and carb counting (carb replacements) • Fats saturated vs unsaturated fats • Bread making for diabetics • Fresh pasta making for diabetic • Savoury food items for diabetics • Glucose and sugar alternatives • Dairy based desserts (no carbs) • Sweet products based on pastry with reduced carbs • Suitable fruit and dried fruit 	
<i>5.2 Skills – at the end of the module/unit the learner will have mastered the following skills:</i>	
Applying knowledge and understanding	
<i>The learner will be able to:</i>	
<ul style="list-style-type: none"> • Prepare a clean environment, adhere to clean as you go procedures. • Prepare and produce a variety of desserts suitable for diabetics • Prepare and produce savoury foods suitable for diabetic • Prepare a variety of baked and fermented products including bread • Be able to produce safe foods for diabetics 	

5.2.1 Judgment Skills and Critical Abilities The learner will be able to:	
<ul style="list-style-type: none"> Assess prepared dishes in the kitchen Verify and evaluate baked and finished pastry products. 	
5.2.2 Additional Module-Specific Communication Skills, if required. The learner will be able to:	
Gain confidence about the condition and be able to deliver safe foods to client without hesitation.	
5.3 Competences: – at the end of the module/unit the learner will have acquired the responsibility and autonomy to:	
<ul style="list-style-type: none"> Be responsible to prepare diabetic savoury dishes Be responsible to prepare a selection of diabetic desserts and baked items including bread. Know the procedure one needs to follow when catering for this condition Ensure the ingredients are as required when preparing dishes Supervise the preparation and production of recipes by other team members in the kitchen. 	
6. Hours of total learning for this Module/Unit	
Contact hours: <input type="text" value="20"/> <i>(Lectures/ seminars/ tutorials/ participation in online forums/ video lectures and other learning activities under the direction and control of an instructor)</i>	Supervised Practice hours: <input type="text" value="14.5"/> <i>(During these hours the learner is supervised, coached or mentored)</i>
Self-Study hours: <input type="text" value="5"/> <i>(Estimated workload of research and study)</i>	Assessment hours: <input type="text" value="1"/> <i>(Examinations/ presentations/ group work/ projects/ etc..)</i>
6.1 Total Number of ECTS/ECVETs of the Module/Unit __1__ ECTS / ECVETs	
6.2 Please explain how this module/unit will be taught	

Teaching Method	Choose most appropriate (Tick)	Brief Description	
Lecturer Centred			
Learner Centred			
Content Centred	X	Theory linked with practical	
Practical / Hands-on	X	Demonstrations followed by hands on cooking by students/chefs	
Interactive / Participative			
6.3. Please explain how this module/unit will be assessed (ex: presentation 40% and assignment 60%)			
Assessment Type	Choose Most Appropriate (Tick)	Percentage	Number & Metric
Exam			
Practical Exam			
Presentation			
Case Study			
Assignment	X	70%	Modify 2 recipes to make them suitable for diabetic & try them out at work
Portfolio			
Report			
Poster			
Journal			
Practical Test			
Project			
Class Test	X	30%	30 minutes multiple choice test
Listening Task			
Research			
Dissertation			
Coursework			
Additional Notes:			
7. Reading list			
Core Reading List Notes and presentation by lecturer			

Appendix 4

Lesson 1 recipes

Standard recipe sheet:

Recipe: Whole Wheat Bulgar Bread

Yields: 2 Loaves (16 slices per loaf)

Ingredients:

75g	Bulgar wheat soaked in 120ml hot water (for 45minutes)
12g	Molasses
12g	Honey
6g	Fine salt
60g	Canola oil
450g	Whole wheat flour
30g	Flex seeds ground
22g	Instant yeast
560ml	Warm water
225g	Whole wheat flour
45g	Corn meal (Polenta)
90g	Oatmeal
420g	Strong flour

Nutritional content per serving

Calories 145

Fats 2.5g

Saturated 0.3g Mono saturated 0.1g

Sodium 220mg

Carbohydrates 27g

Fibre 3g

Protein 4g

Method:

- Mix the moistened bulgur, molasses, honey, salt, canola oil, 450g whole wheat flour and yeast. Add in the warm water and mix thoroughly.
- Add 225g whole wheat flour, corn meal and oatmeal and mix well. Add enough strong flour to make a smooth stiff dough. Knead well to develop the gluten content in the dough.
- Put in a floured bowl and sprinkle flour on top and cover with a wet cloth, allow to ferment and prove until it doubles in size.
- Knock back the dough and re ferment again until it doubles in size again.
- Knock back once more, divide dough in two and shape into the loaf tin, cover with the cloth and allow to ferment until it doubles in size for the last time before baking.
- Bake at 190°C for 45 to 55 minutes
- Take out of the oven and remove from the oven putting them on a wire rack to cool down

Standard recipe sheet:

Recipe: Oatmeal Bread

Yields: 2 loaves (16 slices each)

Ingredients:

90g	Oatmeal
13g	Margarine
480ml	Boiling water
60ml	Warm water
16g	Instant yeast
70g	Molasses
70g	Honey
9g	Fine salt
260g	Whole wheat flour
390g	Strong flour

<u>Nutritional content per serving</u>
Calories 105
Fats 1g
Saturated 0.1g Mono saturated 0.1g
Sodium 115mg
Carbohydrates 22g
Fibre 2g
Protein 4g

Method:

- Combine oatmeal margarine and boiling water together and set aside for 1 hour.
- Dissolve the yeast in the warm water and set aside for 15 minutes to activate the yeast.
- Mix the molasses, honey and salt with the yeast mixture than combine with the oatmeal mixture.
- Mix in the flour into the mixture and kneed into a smooth dough.
- Put in a floured bowl and sprinkle flour on top and cover with a wet cloth, allow to ferment and prove until it doubles in size.
- Knock back the dough and re ferment again until it doubles in size again.
- Knock back once more, divide dough in two and shape into the loaf tin, cover with the cloth and allow to ferment until it doubles in size for the last time before baking.
- Bake at 190°C for 45 to 50 minutes
- Take out of the oven and remove from the oven putting them on a wire rack to cool down

Standard recipe sheet:

Recipe: Short Crust Pastry

Yields: 10 Portion

Ingredients:

200g	Strong flour
120g	Whole meal flour
4g	Fine salt
½	Lemon zest
120ml	Canola oil
170ml	Iced water
15ml	Milk

Nutritional content per serving

Calories 315
Fats 20g
Saturated 4g
Cholesterol 32mg
Sodium 300mg
Carbohydrates 27g
Fibre 2g
Protein 11g
Sugar 0g

Method:

- In a bowl combine strong flour, whole meal flour, salt and lemon zest.
- Rub in the canola oil into the mixture until a sandy texture is achieved.
- Add the water and milk to the mixture and kneed until a smooth dough is formed.
- Cover with clingfilm and store in a refrigerator for approx. 30 minutes
- Pin out and use accordingly

Recipe: Ricotta pie filling

Yields: 10 Portion

Ingredients:

500g	Ricotta cheese
1	Egg
50g	Grated parmesan
Spring	Fresh parsley chopped

Method:

- Mix all the ingredients together in a bowl until you get a smooth mixture

Assembly of pie:

- Pin out the pastry on a lightly floured surface into 5mm discs.
- Line the bottom of a pie mould with the pastry fill it with 3 cm of the filling and cover with another layer of pastry.
- Bake in a pre-heated oven at 180°C for approx. 20 minutes until golden brown.

Appendix 5
Lesson 2 recipes

Standard recipe sheet:

Recipe: Pasta Dough 1

Yields: 4 portions

Ingredients:

220g	Gluten free flour
6g	Xanthan gum
3	Medium eggs
6g	Salt

<u>Nutritional content per serving</u>
Calories 225
Fats 3g
Saturated 1g
Cholesterol 106mg
Sodium 1172mg
Carbohydrates 43g
Protein 10g

Method:

- Combine flour, xanthan gum and salt well in a bowl
- Add the eggs to the mixture and mix well at first it will be a bit sticky and soft but eventually moisture will be absorbed by the flour.
- Allow to rest for approx. 1 hour.
- Knead, pin out and cut into desired shapes.

Recipe: Pasta Dough 2 (normal with modifications)

Yields: 4 portions

Ingredients:

200g	Strong flour
150g	Whole wheat flour
8g	Salt
3	Medium eggs
20ml	Canola oil

<u>Nutritional content per serving</u>
Calories 389
Fats 14g
Saturated 1g
Cholesterol 93mg
Sodium 812mg
Carbohydrates 65g
Fibre 6g
Protein 13g

Method:

- Mix the flours, salt and oil together.
- Add the eggs and knead into a smooth stiff dough.
- Allow to rest for approx. 1 hour.
- Knead, pin out and cut into desired shapes.

Standard recipe sheet:

Recipe: Chicken pesto sauce

Yields: 4 portion

Ingredients:

450g	Skinless chicken breast cut into 1cm dices
5g	Chicken seasoning
5g	Himalayan pink salt
10ml	Olive oil
600ml	Fresh chicken stock
20ml	Lemon juice
200g	Fresh broccoli florets
100g	Fresh peas
75g	Basil Pesto

Nutritional content per serving

Calories 281
Fats 9g
Saturated 2g
Cholesterol 45mg
Sodium 2094mg
Carbohydrates 17g
Fibre 3g
Protein 26g
Sugars 6g

Method:

- Toss the chicken pieces in the chicken seasoning mix and set aside.
- Heat the olive oil in a frying pan over medium heat. Add chicken and brown evenly; remove from the pan.
- In the same pan add the stock and lemon juice, bring to the boil add 400g of fresh pasta fettucine bring to the boil and reduce the heat slightly cook for approx. 4minutes.
- Add broccoli, peas and chicken, cook for another 3 minutes.
- Stir in the pesto mix well and serve.

Standard recipe sheet:

Recipe: Sweet pastry

Yields: 8 Portion

Ingredients:

100g	Almond flour
80g	Coconut flour
4	Eggs
60ml	Olive oil
2g	salt
20g	Stevia powder sugar

Nutritional content per serving
Calories 207
Fats 10g
Saturated 3g Mono saturated 0g
Cholesterol 71mg
Sodium 138mg
Carbohydrates 8g
Fibre 5g
Protein 6g
Sugar 3g

Method:

- Place all the ingredients into a food processor and blend for 1 to 2 minutes to combine well. At first the mixture will look quite runny, but as the flour absorbs the moisture it will swell and eventually thickens. It should be a thick and sticky dough.
- Line the baking dish with baking paper and pace the dough on the paper.
- Moisten your fingers with water so as to avoid dough sticking to hand, then using the palm of the hand flatten out the dough evenly in the baking dish. Make sure the dough is opened evenly through. Dock the pastry.
- Place the sweet pastry in a pre-heated oven at 180°C for approx. 25 minutes until the edges begin to brown.
- Allow to cool before removing from the mould
- Fill with whatever filling you wish.

Standard recipe sheet:

Recipe: Pastry cream

Yields: 4 portion

Ingredients:

150g	Stevia powder
8	Egg yolks
500ml	Coconut milk
220ml	Single cream
35g	Arrowroot powder
1	Vanilla pod
	Pinch salt

Nutritional content per serving

Calories 177
Fats 15g
Saturated 11g Mono saturated 0g
Cholesterol 246mg
Sodium 64mg
Carbohydrates 6g
Fibre 2g
Protein 6g
Sugar 1g

Method:

- In a large bowl mix the stevia powder, egg yolks, arrowroot and salt together.
- Put the cream and coconut milk in a pot together with the split vanilla pod and put over medium heat until it starts to boil. Once it starts to boil remove from the heat.
- Start to gently pour the milk onto the egg yolk mixture whisking continuously until all the milk is added.
- Strain the mixture into a clean pot and put back on the stove on medium heat again stirring continuously so it cooks evenly. When it thickens remove from the heat and cover the pastry cream with cling film directly in contact with the custard, so it does not form a crust.
- Allow to cool down slightly then put mixture into the pastry cases prepared before.
- Cover tarts individually with cling film and refrigerate.
- Just before serving garnish with any of the below fresh fruit with a low Glycaemia index and serve.
 - apples
 - avocados
 - bananas
 - berries
 - cherries
 - grapefruit
 - grapes
 - kiwi fruit
 - nectarines
 - orange
 - peaches
 - pears
 - plums
 - strawberries

Appendix 6

Lesson 3 recipes

Standard recipe sheet:

Recipe: Raspberry Parfait

Yields: 4 portion

Ingredients:

3 pcs	Gelatine leaves
60ml	Cold water
285g	Raspberry puree (thawed)
245g	Plain non-fat yogurt
1 tsp.	Vanilla essence
3	Egg whites (room temperature)
6g	Crystalline fructose
15g	Shaved almonds (toasted)

Nutritional content per serving

Calories 96

Fats 1.2g

Cholesterol 1mg

Sodium 78mg

Carbohydrates 13g

Protein 7g

Method:

- Bloom the gelatine in the cold water.
- Melt the gelatine with the water over Bain Marie, once gelatine is melted mix in the puree, yogurt and vanilla mixing well to achieve a smooth colour. Put aside
- Using an electric whisk beat the egg whites with the fructose until stiff peaks are achieved.
- Fold in the egg whites (meringue) into the fruit puree mixture gently so as to retain as much air as possible.
- Pour the mixture into the desired moulds and chill until set.
- Before serving sprinkle with shaved almonds.

Standard recipe sheet:

Recipe: Carrot Cake

Yields: 10 Portion

Ingredients:

120g	All-purpose flour
4g	Baking powder
2g	Baking soda
2g	Fine salt
2g	Cinnamon powder
1g	All spice
3	Egg whites
1	Whole egg
75g	No calorie sweetener
40g	Reduced fat margarine
170g	Honey
1tsp.	Vanilla extract
42g	Apple puree
42ml	Vegetable oil
120g	Shredded carrots
42g	Walnuts

Nutritional content per serving

Calories 190
Fats 9g
Saturated 1g Mono saturated 0g
Cholesterol 26mg
Sodium 270mg
Carbohydrates 26g
Fibre 2g
Protein 4g
Sugar 16g

Method:

- In a bowl mix together flour, baking powder, baking soda, salt, cinnamon and all spice. Set aside
- In another bowl whisk together the egg whites and egg.
- In a large bowl beat the sweetener, margarine, honey, vanilla, apple sauce and canola oil until smooth.
- Mix in the egg mixture until it is well mixed finally stir in the flour mix, carrots and walnuts and mix well.
- Put in desired baking trays and cook in a pre-heated oven at 180°C for 40 to 45minutes.

Cream cheese frosting Ingredients:

225g	Low fat cream cheese
50g	Sweetener
½	Vanilla pod

Method:

- Using an electric beater mix all the ingredients together until you get a creamy and light consistency.
- Spread evenly over the top of the carrot cake.

Standard recipe sheet:

Recipe: Tiramisu

Yields: 8 portion

Ingredients:

375g	Ricotta cheese
125g	Light cream cheese
50g	Fructose
30g	Cocoa powder
1	Egg yolk
1tsp.	Vanilla essence
3	Egg whites
20g	Fructose
150ml	Strong coffee
15ml	Coffee liquor
	Sponge fingers recipe below

<u>Nutritional content per serving</u>
Calories 150
Fats 5g
Cholesterol 66mg
Sodium 102mg
Carbohydrates 21g
Protein 6g

Method:

- In a food processor blend the ricotta, cream cheese, 50g fructose, cocoa, egg yolk and vanilla until smooth and creamy.
- In a separate bowl using the electric whisk beat the egg whites and 20g fructose until stiff peaks are reached. (meringue)
- Gently fold the meringue into the ricotta mixture.
- Mix the coffee liquor with the coffee.
- Line the bottom of the serving tray with sponge fingers and sprinkle with half of the coffee-liquor mixture. Spread half the filling on top, repeat layers. Cover and chill overnight.
- Dust with cocoa powder before serving

Recipe: Sponge Fingers

Yields: 8 portion

Ingredients:

4	Eggs separated
75g	Fructose
50g	Whole meal flour
50g	Soft flour
4g	Baking powder

Method:

- Whisk the egg yolks with half of the fructose until light in colour and fluffy.
- Whisk the egg whites with the other half of the fructose until you reach stiff peaks.
- Fold the egg whites into the egg yolk mixture, fold in the dry ingredients all together and mix into the egg mixture.
- Pipe into sponge fingers on baking trays and bake at 200°C for 6 to 8 minutes.

Appendix 7

Lesson 4 recipes

Standard recipe sheet:

Recipe: Ice cream

Yields: 8 Portion

Ingredients:

125ml	Evaporated milk
30g	Fructose
370ml	Skimmed milk
15ml	Vanilla extract
3	Eggs

Nutritional content per serving

Calories 161

Fats 2g

Saturated 1g

Cholesterol 9mg

Sodium 254mg

Carbohydrates 17g

Sugar 17g

Method:

- Combine evaporated milk and sugar together and beat well until sugar dissolves.
- Add the skimmed milk and vanilla and mix well.
- Heat the milk mixture until it reaches boiling point.
- Remove from the heat and pour straight away gradually on the eggs mixing vigorously to avoid scrambling the eggs.
- Cool down the mixture rapidly in blast chiller
- Churn using the ice cream machine

Standard recipe sheet:

Recipe: Baked Lime Cheesecake

Yields: 8 portion

Ingredients:

Crust

75g	Graham cracker crumbs
40g	Reduced fat margarine
15g	Sweetener

Cheesecake mixture

450g	Reduced-fat cream cheese
65g	Sweetener
1	Egg
2	Egg whites
2pcs	Lime micro grated zest
45ml	Lime juice

Nutritional content per serving

Calories 197
Fats 11g
Cholesterol 58mg
Sodium 366mg
Carbohydrates 14g
Protein 9g

Method:

- For the crust melt the margarine in a pot and combine with the cracker crumbs and sweetener.
- Spread evenly in the bottom of the ring and compact it tightly.
- For the cheesecake mixture beat the cream cheese with the sweetener on medium speed of a mixer until sugar is dissolved completely.
- Add the egg, egg whites, lime peel and juice until well blended.
- Pour the cheesecake mixture over the cracker crust and bake in a preheated oven at 160°C for 30 to 35 minutes or until centre is almost set.
- Allow to cool completely so it sets.

Standard recipe sheet:

Recipe: Chocolate & Peanut butter brownie.

Yields: 10 portion

Ingredients:

55g	Low fat margarine
75g	Stevia
80ml	Cold water
3	Eggs lightly beaten
60ml	Canola oil
5ml	Vanilla essence
160g	Whole wheat flour
5g	Baking powder
55g	Peanut butter
50g	Cocoa powder
45g	Dark chocolate chips

Nutritional content per serving

Calories 230
Fats 17g
Saturated 3g trans saturated 1g
Cholesterol 43mg
Sodium 91mg
Carbohydrates 19g
Fibre 4g
Sugar 2g

Method:

- Melt the margarine over low heat, remove from the heat once it is all melted. Add the sugar and water.
- Whisk in eggs, oil and vanilla until combined into a runny batter.
- Place peanut butter in a small bowl and gradually add 65g of the flour until smooth and set aside.
- In another bowl combine the remaining flour, baking powder and cocoa powder. Mix the cocoa powder mix into the first batter and mix well until mixture is smooth.
- Stir in the chocolate chips and pour mixture into the prepared baking tray
- Drop spoons of peanut butter in small mounds on the chocolate batter in the baking dish.
- Using a tip of a knife swirl both batters together.
- Bake in a pre-heated oven at 175°C for approx. 20 to 25 minutes or until top springs back when slightly touched.