

Requirements Model of Cardiff University's Coffee Shops

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Abstract

The motivation behind this project are the coffee shops in Cardiff university, students and staff have expressed that they are not meeting the needs of the customers. To address this problem and help position the coffee shops so that they are able to meet the needs of their customers, this project takes the first steps in this process by defining the requirements of the customers. The subjects of this research are the students and staff who represent the bulk of the customers of the coffee shops. To gather and understand the requirements of the students and staff a number of elicitation techniques have been used and augmented to fit the needs of this project. A large number of students and staff have been involved in this project. A requirements base has been developed and is set out in this document. The implications of these requirements, if they are taken on board by the university are wide reaching, students will have a richer experience due to the coffee shops meeting their needs there will be quality social spaces within the university that students and staff can use.

Acknowledgments

I am indebted and heartily grateful to my project supervisors, Professor Roger M. Whitaker, and Matthew J. W. Morgan for the help and guidance they have given me throughout this project. Besides I would thank all of my friends and colleagues who have been an excellent source of data for the project. Finally I would like to thank all of the staff that work in the university coffee shops, they have been a great help and are always willing to answer questions.

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Introduction

This project is centered around the coffee shops in Cardiff University, in particular developing a requirements base for the shops from the customers' perspective. The fundamental aim of this project is to produce a quality set of requirements, that are based on what the customers of the coffee shops have expressed through the rigorous implementation of elicitation techniques. Development and application of best practices have been defined and implemented in this project to maintain quality throughout. The results of this project will be given to the Catering and Bars department and it is hoped that the findings will be used to improve the coffee shops in the university. In turn, if the requirements defined in this document are implemented by the University, it will benefit all who come to the institution and result in a richer student experience.

The driving force behind this project is that a number of students and staff have commented that their experience in the coffee shops in the university, compared to those outside, differ considerably. Naturally, there are comparisons made between coffee shops in Cardiff University and those in the city of Cardiff and elsewhere and there are major differences. Given these driving forces the scope of the project is to develop a set of requirements from the students and staff point of view, disregarding the operational requirements of the coffee shops set by the Catering and Bars department. To define the requirements of the students and staff elicitation techniques have been used. These include focus groups, interviews and questionnaires. A number of analysis techniques were used to draw out the set of requirements from the elicitation methods used. All of the requirements in this document can be traced back to sources where students or staff have expressed their views. As a result of this project an extensive requirements base has been developed along with the best practices that have gone into defining and developing the quality requirements.

Background

This is a requirements engineering project project focused on the coffee shops in Cardiff University. Requirements engineering is a discipline that involves the eliciting, developing, documenting and maintaining a set of requirements. A requirement is basically a statement of need, the IEEE definition can be seen in definition 1. this project is to seek and develop a set

Definition 1: Requirement

1. A condition or capability needed by a user to solve a problem or achieve an objective.
 2. A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.
 3. A documented representation of a condition or capability as in (1) or (2)
- (IEEE 610.12, 1990)

of requirements for the coffee shops for a particular set of stakeholders. There are a number of stakeholders involved in the university coffee shops, all of them possessing differing requirements. The key stakeholders that were identified to be the subjects of this requirements engineering project are the students and staff, these two groups represent the core customer

base for the coffee shops in the university. The fact that students and staff represent the bulk of custom for the coffee shops is the main reason behind why they were chosen to be the subjects of this research. There is a multitude of best practices that exist in the literature regarding requirements engineering, and for the purpose of this research a number of them have been used and also altered to fit the needs of the project. The practices used have been laid out in this document.

Focus groups

Focus groups (also known as focused interview) is a form of group interview that is centered around a topic of interest to the researcher. For this project focus groups have been used as a

Definition 2: Focus groups

A focus group is a form of group interview that capitalizes on the interaction between participants in order to generate qualitative data around a given subject.
(Kitzinger, 1995)

method of eliciting requirements from sets of key stakeholders in the coffee shops. The participants of the focus groups are the key stakeholders group students.

Characteristics of Focus Groups

According to Krueger and Casey (2009) there are five common characteristics of focus groups and they are:

- (1) people, who,
- (2) share certain unifying characteristics, they
- (3) provide qualitative data, through a
- (4) focused group discussion
- (5) to help a researcher better understand the topic of interest.

There is a further characteristic that can be attributed to focus group research and that is that there is often 6 +/- 3 participants in any given group. The limited number of participants ensures that there is ample opportunity for all those involved to air their opinions in the same space and that the researcher conducting the interview has a manageable number of participants to work with.

Question development

Careful question development is key to successful focus group research. There are a number of different considerations that one must take into account when developing questions for focus group sessions and how they will be delivered to the participants. One such consideration is whether or not to standardise a set of questions to be delivered to the participants. Morgan (1996, p.142) argues the case for standardised questions over a set of focus groups because of the high level of comparison that can be achieved when questions are standardised over a set of focus groups. Standardisation allows for comparisons to be made between sets of stakeholders, for example students and staff, and also between individual focus groups. However, a major disadvantage of strict adherence to a set of predefined questions is that

there are developed before entering into the field and one would lose quite a bit of the exploratory power that come from focus group research. For this project the research has adopted a hybrid method with a core set of standardised questions that were developed through looser open styled prototype focus groups with participants know to the researcher where the questions were discussed and any ambiguities were ironed out of the set of developed questions.

A key consideration to the researcher when developing the set of questions for the focus groups was the notion of a “*question route*”. It is key that for the overall usefulness of the focus groups

Definition 3: Question Route

A question route is the notion of questions that as a whole are designed to facilitate participants’ cognitive processes in order for them to focus on the subject important to the researcher. Question routes act as a cognitive lense that focuses group discussion onto the topic in a subtle way.

that an appropriate question route is developed so that the participants offer up their thoughts and feelings on the subject and therefore make the requirements that are derived for the focus groups inherently richer and reflective of their needs as key stakeholders. According to Krueger and Casey (2009) there are eight quality characteristics of good questions and a good questioning route. These are:

- **Evoke Conversation**
 - Focus groups are all about conversation and communication between participants. Conversation will evolve over the focus group session as over time the participants become more comfortable with one another and they will begin to direct questions and build upon ideas amongst themselves rather than directing them at the moderator. Conversation will relax the participants and allow for greater levels of spontaneity and idea development.
- **Use Words that Participants Would Use When Talking About the Issue**
 - The researcher has to understand the demographics of the group and reflect on the questions developed so that any language that is used can be clearly understood by all of the participants.
- **Easy to Say**
 - Questions have to read well so that the research does not stumble over the words in the question, this will make the questions easily spoken and memorised.
- **Clear**
 - There must not be any ambiguity over the meaning of questions. Questions have to be developed in a way so that the participants understand what is being asked and do not need lengthy background information and clarification as to the meaning of a question.
- **Short**
 - Long questions are harder to understand and can be confusing to participants.

Clarity of the question is related to length, the longer the question the more unclear it becomes to the participants.

- **Open-Ended**
 - Open-ended questions are the backbone of focus groups, they allow for discussion, explanations and elaboration among the participants of the focus group.
- **One-Dimensional**
 - Questions should only contain one core concept. For example, “*what are your expectations of a coffee shop*”. In the example there is only one concept “*expectations*”. If a question contains two or more concepts, for example, “*what are your expectations and needs of a coffee shop*” the duality of two conceptions can be confusing to the participants and lead to a misunderstanding of the question. It is therefore good practice to develop questions with one core concept.
- **Include Clear, Well-Thought-Out Directions**
 - If one is asking participants to do something, then instructions should be clearly stated and unambiguous.

The development of the questions in the question route used in this project have been assessed against these quality characteristics. This was done to ensure a level of quality of questions in the focus group. The questions developed adhered to these characteristics and lead to rich focus group sessions.

The Question Route

The question route that was developed for this project consisted of 5 categories of questions; these five are as follows:

Opening

All of participants were asked to an opening question, this question is there to facilitate discussion right at the beginning of the focus group. Opening questions allow participants to introduce themselves to the group and become familiar with other participants. Effectively acting as an icebreaker.

Introduction

Introductory questions are used to introduce the topic that is the focus of the group. They relate the topic in some way to the participants. For example: “*what were your impressions of the university coffee shop?*”. By asking a question that links the participants emotionally: “*your impressions*” to the topic of focus: “*University coffee shop*” it encourages discussion and emotional buy in to the topic. Introductory questions sow the seeds in the participant’s mind of the topic and how it relates to everyone in the group.

Transition

These questions act as a bridge from the introduction onto the key focus of the study. They allow participants to develop an insight as to how different members of the group view the subject and set the tone for the main focus of the research.

Key

Key Questions are the core of the study and represent the richest areas of information that is useful to the research. These questions are where most of the discussion by the group should be allowed to take place as the results drive the study.

Ending

Ending questions close off discussion and aim to bring about conclusions to what has been said. They allow for reflection within the group both through the questions and from the moderator who summarises what has been said by the group and asks for their approval of the summary. Ending questions also allow for any further elaborations or ideas to be put forward by the group.

Question route used for this study:

Question type	Question
Opening	Hello and welcome
	Thank you all of attending this session today
	What is your name?
	Tell the group what you study in university.
Introduction and	Can you describe your favorite coffee shop to the group?
Transition	What are your expectations of a coffee shop?
	What was your first experience of a university coffee shop?
Key	What were your impressions of it?
	In your opinion, what are the major differences between Cardiff universit coffee shops and coffee shops elsewhere?
	What do you enjoy most about the university coffee shop?
	What are the least enjoyable aspects of the coffee shops?
	How would you improve the services provided by the coffee shops?
Ending	Of all of the needs discussed, which ones would you identify as being the most important to you?
	The purpose of this focus group is to help me define what your requirements are as a customer. Given what we have discussed is there anything that you feel we have not covered that should be discussed?

Table.1 Focus group question route.

The question route in Figure.1 was developed with the quality criteria in mind. The ordering of the questions was developed so that there are no questions with negative connotations before

questions with positive connotations. Hence the question “What do you enjoy the most about the university coffee shops?” is asked before the question: “What are the least enjoyable aspects of the university coffee shops?”. The reason for this is so that the participants have the opportunity to air both positive and negative emotions about the coffee shops and to ensure that the question route has little impact on how the participants responded in the discussion. This allows for a level of impartiality that is adopted by the researcher when carrying out the focus groups.

Focus Group Environment

When conducting focus groups it is important to consider the environment in which they are being conducted. There are a number of reasons for this, foremost being the need to have an environment that is seen to be comfortable by the participants so that they are able to feel relaxed. It is very important for the participants to feel relaxed within the environment and amongst the members of the group, because if they do not then it is unlikely that there will be frank and fruitful communication between them. If communication is stunted then the data produced will be inherently less rich. All of the participants that were involved in the focus groups were familiar with Cardiff University Queens Buildings on Newport road, either through studying in the building or having food in the canteen. For this reason the decision to use the study rooms in the Trevithick library to conduct all but one of the focus group sessions was made. The one session where these rooms were not used was due to the participants being based in Cardiff University's humanities building on Columb road, for this session a similar study room was used in the Julian Hodge library.



Figure.1 Study room



Figure.2 Study room

Figure.2 and Figure.3 are photographs of the room that were used in the Trevithick library to conduct the majority of the focus group sessions (a similar sized and equipped room was used in the Julian Hodge library for the others). The room is large enough for 6+/-2 participants to sit comfortably around a large table. The room is equipped with plug sockets for the laptop, a screen that was used to show the participants and the presentation containing the questions. The screen was used to enable the participants to, at any point, read over the question being

asked without having to ask the researcher; this allowed them to focus on the topic and the question being asked. Furthermore the room is easy to get to for all the participants invited.

Conducting the Focus Group

The focus groups were all conducted following a procedure; this procedure ensures that all of the focus groups were conducted in the same way. Firstly the participants would meet up with the researcher in the reception of the library, the researcher would then lead the participants into the meeting room. The researcher and the participants would talk informally, discussing the project as a whole and what they should expect from the focus group session. When all the participants arrived and were seated in the meeting room the researcher handed out an explanatory statement. This statement explained in a short sentence what the project was about and the purpose of the focus group. At this point the researcher also handed out consent forms to the participants for them to sign, this form can be seen in Appendix 8. The participants were informed that the session would take anywhere between half an hour to one hour. In all of the focus group sessions there were light refreshments available, cold drinks and hot drinks. All participants received a goody bag containing chocolate and sweets for attending the session as a token of appreciation for giving their time to attend the session. Both the refreshments and goody bags were used to relax the participants and get the group talking to one another.

Visual aids

In order to supplement the questions for the focus groups, a presentation was developed. This presentation was built on the “prezi” platform (Prezi Inc. 2013). There are a number of reasons for developing visuals to supplement the questions, foremost being is that they afford the participants a point of reference other than the researcher conducting the session.





Thank you all for you time and input. James Mackenzie

Figure.3 Slides

Participants are able to reference the question at any time by looking at the screen. This limits the need for the researcher to reiterate the question being asked to the participants and interrupt communication between the members of the group. Examples of the some slides used during the focus groups can be seen in Figure.4, as one can see a number of images were placed in the slides to accompany a given question when appropriate. The question: "What were your first experience of university coffee shops; what were your impressions of it?" in the presentation is accompanied by a number of images of university coffee shops.

Analyzing the Focus Group Results

There are a number of different methods that can be used to analyse data that is produced by focus groups. They all vary in complexity and skill level needed to achieve the desired result. These methods range from memory based analysis, this method is usually best suited to professionals that have had years of experience in conducting and analyzing focus groups, to computer based analysis. Due to the inexperience of the researcher in this project and lack of funds for expensive analysis software a low tech *traditional* approach has been adopted.

Inventory of points discussed

Inventory of points discussed is a method whereby data that is gathered from the focus groups is dissected into individual points of interest to the research. The dissected pool of points are then sorted into the different questions they address. If more than one participant comes out with the same idea over the set of focus groups then its logged in the inventory of points. This method is most useful when there is a need to investigate the clear distinction between groups. For the purposes of the requirements engineering project this method of analysis is not well suited as a primary method, this is because the purpose of these focus groups is to elicit requirements. There is, however, one aspect of the methodology which consists of simple sentiment analysis that is useful to gauge the overall emotion that is expressed by the students when talking about the coffee shops. For example, when asked a positive question: "*what do you enjoy most about the university coffee shops?*", there are numerous incidents where the students offer negative responses such as: "yeah for me it just doesn't seem like I said it just doesn't seem to be a coffee shop." (Responses to Question 6). Therefore the part if the method

that pertains to sentiment analysis will be used in this project.

Note based

Note based analysis relies on the notes taken by the researcher during the focus group session. This method relies heavily on the quality of notes taken when the focus group is in session and the experience and knowledge of the researcher. The researcher needs to understand in depth the subject of the focus group in order to know when something significant is said by the members of the focus group. This method is not suitable for this project due to the researcher's lack of experience in conducting focus groups. Moreover it was felt that the researcher's learning difficulty would inhibit his ability to produce quality notes.

Classic Strategy

For this approach all of the recorded focus group sessions have to be transcribed. The transcribed text are then disassembled so that all of the individual quotes from the participants can be arranged according to the various questions they address. A systematic approach is then undertaken by the researcher, this involves taking the corpus of quotes that have been disassembled from all of the the questions and analysing them individually. To assess each quote a systematic method of asking questions about the quote is used to sort them into the areas they address. These questions are as follows:

1. Did the participants quote answer the questions that was asked?
IF YES ---> Go to question 3
DON'T KNOW ---> Set the quote aside to review it later
NO ---> Go to question 2
2. Did the participant's quote answer any other question of the focus group?
IF YES ---> Go to question 3
NO ---> Put the quote in the discard pile
3. Does the participants quote contain something important to the topic or defined a requirement?
IF YES ---> Place the quote with the relevant question
IF NO ---> Put the quote in the discard pile
4. Is it like something that has been said earlier?
IF YES ---> Group similar quotes together
IF NO ---> Start a new group

This simple, systematic sorting produces sifts what has been said over all of the focus group sessions into clearly defined categories under the correct questions that the participants have addressed.

Meaning Condensation

Meaning condensation has been defined by Kvale and Brinkmann (2009) as a method of abridgement of the meaning that is expressed by the subjects of the interview into a short formulation.

Definition 4: Meaning condensation

Meaning condensation is a qualitative analysis method that involves the abridgement of the meaning that is expressed by the subjects of the interview into a short formulation. This method retains the original flow of conversation (Kvale and Brinkmann, 2009 p.205).

The narrative of the interview remains intact with all of the statements expressed by the subjects condensed into a few words with the essential meaning of the 'natural unit' of expression summed up in a short sentence. This is done systematically over the whole corpus of interview transcriptions. This method can be used for both focus groups that have been conducted and the interviews.

The Method

Meaning condensation analysis consists of five steps:

1. The complete transcript is read over by the researcher to get a sense of the whole
2. The text is then decomposed into "natural meaning units". These units are defined by the researcher reading the text
3. The central theme of the meaning unit is developed by the researcher and summarized in a few words
 - a. For the purpose of this project a substep is added to this method. A summary of potential requirements is also listed along with the central theme of the interview/focus group.
4. All of the meaning units identified are assessed against the purpose of the interviews/focus groups. Their relevance to Cardiff university coffee shops and requirements gathering
5. A summary of the entire interview/focus group is produced by the researcher.

Analyzed Focus Group Material

What you enjoy most about the University coffeeshop?		Positive(1)	Negative(1)	Nutral (1)
Buying habits	If I use the coffee shop in the JCR is purely to buy a sandwich or drink	0	0	1
	I use it very much like a Cornershop or newsagents rather than a coffee shop.	0	1	0
Environment	I agree with Charlotte I also think like it's a different environment to being between lectures.	1	0	0
	yeah it's a good place to go to sit down and have a chat, it's on premises.	1	0	0
	I guess it provides a place to meet if you have got group work and things like that, and you can't do it in the library because of the noise restrictions.	1	0	0
	I think the students make the environment I think if you're going in there with your friends environment is absolutely fine	1	0	0
	I've never gone in and thought woo its abit weird in here I think you do go in there with your friends. So I think it's a space where you make your own environment.	1	0	0
Feelings for coffee shop	I think there's nothing particularly positive about this one	0	1	0
	basically Julian Hodge I can't fault other than the opening times it's really nice there.	1	0	0
Coffee & drinks	because I don't like coffee I quite like the fact that it sells other things	1	0	0
	I think if it's going to call itself coffeeshop it should have coffee things there but the fact that it does offer other choices is good.	0	1	0
	get my tea its grate, makes my week	1	0	0
service	the easy of it to get the coffee from the machine	1	0	0
	entrance is really easy and quick	1	0	0
	It's really easy to use the...	1	0	0
		1	0	0
		0	0	1
		0	0	1

Figure.4 Inventory of points

Figure.5 is an extract from the inventory of points discussed from the focus group sessions.

The inventory contains all of the points made for the differing questions over all of the focus

groups. The points are then associated with the question which they address. All of the points that are in the inventory have been analysed to determine the polarity of sentiment that the point is putting across. Sentiment analysis of the points was done using a natural language API developed by Jacob Perkins implemented in Python with the use of the natural language tool kit (Perkins, 2013). Each point was given either a positive, neutral or negative score depending on the results from the API. This form of analysis is useful when one is trying to understand the emotions that are being expressed in the points made by the students given the question asked in the focus groups. One of the major benefits of this method of analysis is that at a glance, one is able to view all of the comments from the students addressing a question in a single document. Furthermore, through the analysis, the comments have been sorted into defined categories, for example: “Food & Drinks”, “Environment”, etc. These categories assist the requirements elicitation process by giving the researcher a reference of comments of one type.

Meaning condensation

The method of meaning condensation is simple: one takes the corpus of transcribed focus group material and reads through it. The next step of the analysis is to break up the text in to its “Natural Units” these are logical chunks of text that contains a theme. The central theme of the natural unite is summed up in a short sentences. For the purpose of this project a requirements analysis set has been added to the method of meaning condensation, this is done by identify possible requirements in the natural unit and summing them up in the “Requirements” section for review later. One can see an example of this analysis in Table.1.

Focus Group 3

Natural Unit	Central theme	Requirements
if were talking in terms of coffee and hot drinks and lack of choice. Unless you want your bog standard coffee, cappuccino, latte. If you want something special then your pretty stuffed.	G thinks theres a lack of choice when it comes to coffee.	Off a range of coffee that people expect.
yeah that's about it really. It could be a little more well appointed it's a bit basic and bland isn't it. it's more the tuck shop as you say.	G thinks the coffee shop could be more like a coffee shop.	Provide a coffee shop experience to the customers.
yeah. a tuck shop with a coffee machine. so in terms of the chairs and the tables they are just cheap, hard, nasty. A bit fue as well I find especially around lunchtime it gets pretty busy in there.	G thinks the coffee shop is like a tuck shop. There is often nowhere to sit	Off a range of setting so you can sit on your own and in big groups.

if I was going to somewhere like costs I'd be there for a lot longer so I would expect it to be little comfier so you can sit there, do little bit of work on the laptop chill out. in terms of the JCR I'm only there for 45 minutes tops chatting to people so yes it's a bit of a different feel. It's not so much comforted its more function.	G spends less time in the coffee shop in university than in others. Its more of a funchale feel to the coffee shops.	Make the coffee shop somewhere people want to spend time in.
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Table.2 Meaning condensation analysis.

Interviews

Interviews were used in the project to elicit requirements for the set of key stakeholders: the academic staff who work at Cardiff University. Interviews were felt to be more appropriated for this stakeholder due to their busy schedules. There were some attempts made at conducting focus groups with sets of academic staff, however, there were significant difficulties with the mis-match of timetables and schedules. All of the academic staff that were interviewed hailed from the Computer Science department in Cardiff university. For the purpose of comparison it was felt that the questions for the interviews should be very similar to the question route of the focus groups. At the time of conducting the interviews the question route for the focus groups had been tried and tested in the trial groups and through discussions with mentors and participants. Therefore it was felt that the question route adequate and would fit into an interview context.

Interviews can be used to effectively elicit requirements from a subject in a rich way. There are three basic types as distinguished by Pohl (2010, p.409) who states that there are three kinds of interviews that can be conducted: standardised interviews, exploratory interviews and unstructured interviews.

Standardised interview: an interviewee is asked a set of prepared questions that are of interest to the investigation. In this standardised form of interviewing there is no diversion from the set of questions asked by the conductor of the interview, regardless of the response from the interviewee. This form of standardisation is useful when it comes to the comparison of the results across the set of subjects.

Exploratory interview: this method of interviewing is more elastic, there is a set of predefined questions to ask the subject but the conductor is not bound to use only these. They can have a conversation with the interviewee to explore their responses to the questions being asked and

dig deeper. Due to the non-standardised form of this method the results of these interviews are qualitative and it can be difficult to conduct comparisons.

Unstructured interview: this method does not have any form of predefined questions that are to be asked to the interviewee. The conductor is free to ask any questions in a broad manner and can lead the conversation in any direction in regard to the investigation. This method can produce rich responses but it is almost impossible to compare the results due to the differing means of execution.

Given the purpose of the interviews, to elicit requirements, it was felt that the method most suitable for this was the exploratory method of interviewing. This method is not bound by a strict set of questions that cannot be deviated from, such as the method of standardised interviews. Conceptually the exploratory interview is very similar to popular methods used in focus group interviews whereby there is a set question route that is followed, however, deviation and illustration is encouraged from the participants. These deviations make for rich qualitative data around the coffee shops as a result. Oppenheim (2003, p.66) argues that standardised interview methods are simply an exercise in data collection, whereas exploratory interviews are heuristic; they are able to gather and develop ideas around a research topic. The conceptual similarities between focus groups and exploratory interviews is important when one is comparing the two stakeholders. This desire to compare the sets of stakeholders also contributed to the decision to produce similarities in the question route in both the focus groups and the interviews.

Question route

Question Number	Question
1	Can you describe your favourite coffee shop?
2	What are your expectations of a coffee shop?
3	What was your first experience of a university coffee shop?
4	What were your impressions of it?
5	In your opinion, what are the major differences between Cardiff university coffee shops and coffee shops elsewhere?
6	What do you enjoy most about the university coffee shop?

7	What are the least enjoyable aspects of the coffee shops?
8	How would you improve the services provided by the coffee shops?
9	Of all of the needs discussed, which ones would you identify as being the most important to you?
10	The purpose of this interview is to help me define what your requirements are as a customer. Given what we have discussed is there anything that you feel we have not covered that should be discussed?

Table.3 Question Route, Interviewees

The question route developed for the interviews can be seen in Table.1. As one can see the questions are very similar to the questions asked in the focus groups. The question route follows the same logic that was applied for the focus groups.

Conducting the Interviews

As with the focus groups there are a number factors that need to be considered when conducting interviews. In order to have a fruitful, open and successful interview, one of the most important factors is comfort. When one is able to make a subject comfortable then he or she will be more willing to talk openly with the researcher around the topic, participants are more likely to discuss their emotions on a topic when they are relaxed. **(QUITE READING)** The factors of openness is very important if one is going to get to the route of what people think of the coffee shops and elicit requirements from the participants. It was felt by the researcher that given most academic staff in the School have their own office space, that therefore it would be appropriate to conduct interviews in the interviewee's office. Conducting the interview the subject's own space means that they will be more inclined to feel relaxed in the environment.

To start the interview the researcher would discuss with the participant the project and the purpose of the interview. It is important that the subjects are clear as to the purpose of the interview and that any questions they ask about the study is answered. An explanatory statement was given to the participants during this initial stage of the interview, this statement document can be seen in Appendix 6. Also the participants were given a consent form, giving the researcher the right to record the session and use the data in the research, this can be seen in Appendix 7. Kvale and Brinkmann (2009) argue that this initial stage is critical to the overall success of the interview. The subject has to feel as if good contact has been made between themselves and the researcher. This is achieved by attentive listening with the researcher showing interest and understanding as to what the participants are saying, and being respectful and polite (Kvale and Brinkmann, p.128 2009). Within seconds a subject will make a decision as to whether they like the researcher, this was a consideration that was at the forefront of interviewing techniques implemented by the researcher. Before questions were asked the researcher offered the subject a choice of a selection of Twinings Tea or coffee.

This was done as a gesture of thanks to the participants for giving their time to the research, also these small gestures can make a big difference as to whether a participant feels comfortable with the researcher or not. A major drawback from staging the interviews predominantly in the subject's office is the potential for there to be interruptions during the course of the interview. There were a number of instances during the interviews where subjects had phones ringing, however, these were few and far between; this was helped in part by the timing of the interviews. Most of the interviews were conducted at the end of the working day when the participants had some free time to spare and the researcher was also free. This meant that given the time of day there were very few interruptions.

Similarly to the beginning of the interview, it is good practise at the end of the interview that the researcher provides a "debrief" to the subjects so that the interviews are rounded off and any new questions that the subject would like to ask about the research is answered. This was done when conducting the interviews for this study. The researcher would ask the subject how they thought the interview went and if there was anything they could suggest that the researcher could improve upon. This debriefing is essential for giving the participants closure, it is the case that the subjects have opened themselves to the researcher, often emotionally, with little in return, and this can lead to anxiety as to what and how their data will be used. Therefore answering any questions at the end of the session is essential.

In order to record what the participants of the interviews said, the sessions were voice recorded using an iPad. This meant that there were few distractions for the researcher when conducting the interviews. Though recording the interviews there was no need to write notes as the subjects answered their questions, meaning that the researcher was able to pay full attention to the subject and what was being discussed. These recordings were then transcribed shortly after the interview was conducted.

Analysing the interviews

The method of analysis implemented for the set of interviews was meaning condensation. This method has been defined in the "meaning condensation" section of this document. This was felt to be the most appropriate method for analysing the corpus of transcribed interviews due to the method's ability to condense the essence of what the interview subject was conveying. The alternative method that has been developed for the purpose of requirement elicitation has proven to be very successful, whereby requirements have been identified through the analysis process. Furthermore when one implements this method to identify requirements there is a solid link between what has been expressed by the stakeholders in the interviews and the requirements that have been elicited. This link can be seen clearly in Table.2, which contains an extract from the meaning condensation analysis performed on interview Number 1 answering the question: "What was your first experience of a university coffee shop? and: What were your impressions of it?". As one can see, the core meaning of what the participants are expressing is summed up in the central theme, and also the possible requirements that are being described are identified along with the text.

Natural Unit	Central theme	Requirements
I think Cardiff University shops are selling services of delivering coffee to their customers in the most convenient way possible. I think coffee shops elsewhere are selling more of a brand image in a more comfortable that you'd like to go , to be with friends and mingle and you don't feel like you've got to rush off or anything else. Somewhere you want to go rather than somewhere you just get a drink.	Other coffee shops are selling a brand, they attract people in with their comfort. People want to go to them.	Have a comfortable environment.
(JAMES So in regards to the provision of food and products what are the differences between Cardiff university coffee shops in your mind and coffee shops elsewhere?) Things are very functional, you know you get your coffee from a vending machine which you serve yourself with the range of goods is quite limited especially in terms of the little treats that you can buy there but of course I am referring more to the refectories where coffee isn't the main thing they're selling I have been a couple of times to some of the other places and they seem to be an extension of a refectory rather than what you really think of as being a nice experience for drinking with coffee.	S does not see the coffee shop in the university as a nice or meeting their needs. They don't provide what S would call a nice experience for drinking coffee.	Understand what is a "coffee" experience in the eyes of the customers. Provided a "coffee" experience

Table.4 Meaning Condensation, Interviews.

Soft Systems Methodology

In order to define a set of information requirements that reflect the key requirements of the students and staff, Brian Wilson's soft systems methodology (SSM) (Checkland & Scholes, 1990) has been used. SSM is a method of analysis that is focused on logic and defensibility. The core of Brian Wilson's approach is the development of a root definition that is valid and defensible from which one can build a conceptual model. A root definition captures the purpose

Definition 5: Root Definition:

A root definition captures the purpose of a system which is seen to be relevant and a conceptual model consists of all activities that are needed to take place in order to fulfill the purpose defined in the root definition.
(Checkland & Scholes, 1990)

of a system which is seen to be relevant to the analysis. A conceptual model consists of all activities that are needed to take place in order to fulfil the purpose as defined in the root

definition. All activities in a conceptual model are logically deduced from the words within a root definition. SSM is used to analyze human activity systems; there is an inherent “messiness” when one tries to model and understand human activity. A driving force behind this “messiness” is that people have differing ways of understanding and interpreting the world, which leads to a number of different viewpoints that people use to assess the world. All of these viewpoints are valid given the way the observer views his or her world. This is also true in businesses all over the world; if one was to ask a number of people in the same organisation to define its purpose, one would have a multitude of differing answers. SSM capitalizes on these viewpoints or “world views” that individuals construct by defining the core purpose of the human activity in a root definition. The root definition, along with the conceptual model can then act as a standard “world view” of a system; one which can be used to assess the real world to see if the human activity is fulfilling its purpose.

During the requirement elicitation process for this project, it was made clear to the researcher that there are indeed a number of differing viewpoints that have been associated with the university coffee shops. One such view of the coffee shops is that they provide a service to the students. Another view of the coffee shop is that it is a money making entity that should provide the services that are expected by the customers. Through the elicitation process and the subsequent analysis, there has emerged an overall view of the coffee shops in the university that is shared by all the stakeholders. Given the analysis of the two sets of stakeholders, students and staff, a clear shared core viewpoint on the coffee shops has been defined. The students and staff take the view that the coffee shops should be a place where people can relax and that they are made attractive and comfortable in order for them to be inviting. They should have a range of quality hot drinks and cold drinks. They should have a friendly atmosphere and excellent customer service. There are a number of other themes that have emerged from the research regarding the requirements through the elicitation process. From the most common themes a root definition has been developed for the coffee shops. This root definition reflects the viewpoint and requirements of the students and staff that were involved in the research. Due to this defensibility a conceptual model built from the root definition will contain all of the logical activities that are involved in fulfilling the needs of the students and staff. These activities all have information needs, for example, if one was to deliver a coffee shop that meets a stated need of students and staff to be open when they are most likely to be in university, then it is clear that one needs to gather information on students’ timetables in order to make decisions regarding opening times. Through modeling the stated needs of the stakeholders a set of information requirements such as the need to know student timetabling can be deduced through the application of logic. It is this power of SSM that is of most use to this research, to define a set of information requirements. Vidgen (1997, p.25) argues that the use of SSM for stakeholder analysis to drive information requirements, is a suitable and compatible method to use when defining these sorts of requirements.

Root Definition

The root definition for the coffee shops was developed from the analysed focus groups and interviews. All that is in the root definition is defensible against the corpus of analysed data

from the students and staffs interviews and focus groups.

A system to provide Cardiff University coffee shops that are attractive to the students, staff and members of the public with environments that facilitate relaxation and a level of service that is expected by the customers by providing coffee shops that have environments that customers feel are comfortable with a mixture of soft furnishings and tables, with decor that is modern, appealing, that sells a range of quality coffee and tea that is expected by the customers, that sells a range of food at a level of quality and freshness that is expected by customers, offering value for money, with a level of customer service that is efficient and friendly, with opening times that suit the customers over the year, with marketing and promotions that effectively draw in customers.

CATWOE analysis

Brian Wilson (2001, p.24) developed a set of criteria containing six elements that root definitions have to fulfill in order for them to be correct and valid. All that is needed for a root definition to be valid is two mandatory elements: a “T”, the transformation process and “W” the a world view. This transformation process is a statement of what a given system is to produce. The second mandatory element is “W” or world view is a statement of belief that defines how the system is to go about achieving the transformation process defined in the root definition. The other elements of the CATWOE analysis are as follows:

Customer - the customer of a root definition is the recipient of the transformation process.

Actors - the actors are those who carry out the activities involved to fulfil the transformation process.

Owners - the owners are those who have the most authority over the system.

Environmental constraints - environmental constraints are aspects of the environment that are out of the control of the system but still have an influence on it and are seen as significant.

Given these criteria, the analysis of the root definition is as follows:

T - A system to provide Cardiff University coffee shops that are attractive to the students, staff and members of the public with environments that facilitate relaxation and a level of service that is expected by the customers

W - By providing coffee shops that have environments that customers feel are comfortable with a mixture of soft furnishings and tables, with decor that is modern, appealing, that sells a range of quality coffee and tea that is expected by the customers, that sells a range of food at a level of quality and freshness that is expected by customers, offering value for money, with a level of customer service that is efficient and friendly, with opening times that suit the customers over the year, with marketing and promotions that effectively draw in customers.

C - Students, staff and members of the public

A - Unspecified

O - Cardiff University

E - Unspecified

The model

A conceptual model has been produced from the root definition. The full model can be seen in Appendix 1. A small section of the model can be seen in Figure.5, it depicts a section of the model pertaining to the range of food sold in the coffee shops. Figure.5 also contains activities

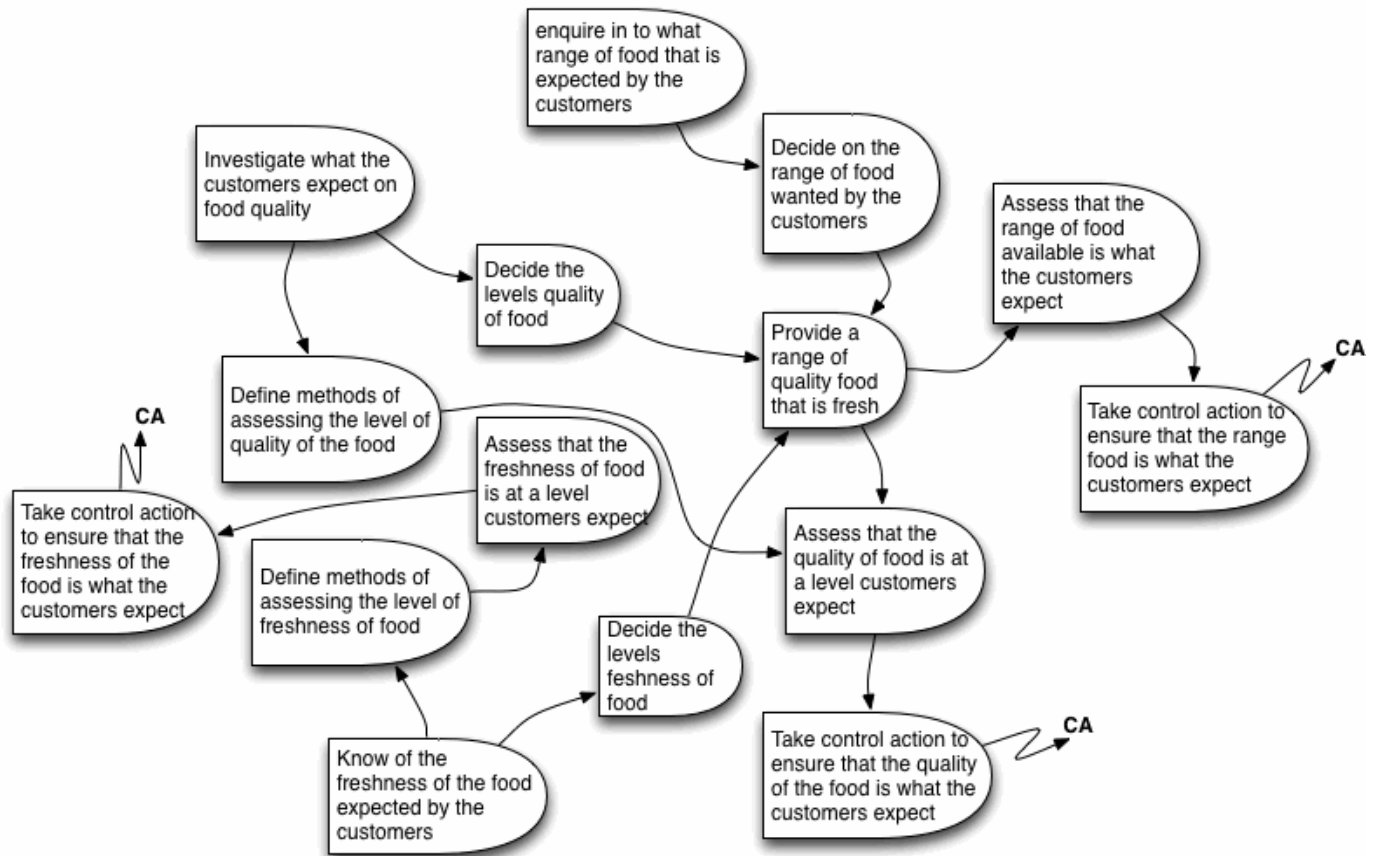


Figure.5 Section of the Conceptual Model

that are involved in the assessment of quality and freshness of the food sold in the coffee shops. There are a number of activities in Figure.4 that require investigation into what the customers of the coffee shops expect, from the range of food sold to the quality of it. The activities all define information needs, for example: “Enquire into what range of food is expected by the customers”. This activity states a the need for the coffee shops to gather information from their customers on what range of food they expect to see sold in the coffee shops. There are also a number of activities that require development and definition of methods. These methods are then used to assess activities in the real world to ensure the system, in this case the coffee shops, are meeting the purpose defined in the root definition. An example of this type of activity is: “Define methods of assessing the quality levels of the food”. Definition of these methods are essential if the coffee shops are to meet the requirements of the customers. Given Figure.4 there are a number of information requirements that can be defined. Figure.6 is an information requirement that has been derived from the section of the conceptual model in

Figure.5. This information requirement states that information has to be elicited from the customers on the food they would like in the coffee shops. This information requirements is needed so that there can be an assessment of the range of food that is being sold in the coffee shop against what the customers expect. Having this information can be used by the carting and bars department to enrich their decision making and allow them to understand what the customers want.

Requirement ID:	I008	Category:	Information
Description:			
Information on products that are popular with customers when they are in similar coffee shops outside of university should be collected so that the university coffee shops are selling products that people expect to be sold.			
Rationale:	Competitor coffee shops in the city of Cardiff offer products that are popular with the students and staff of the University. These products should be investigated and where possible imitated by the university coffee shops.		
Priority:	<div><div>High</div><div></div><div></div><div>Low</div></div>		
Supporting evidence:	CM		
History:			
Date Created:	03.02.13	Date Reviewed:	25.04.13
Changes:			

Figure.6 Requirement I008

Requirement ID:	I007	Category:	Information
Description:			
Feedback on product quality as experienced by the customers of the coffee shops has to be collected.			
Rationale:	This is so that the products sold can be scrutinised against what is expected by the customers.		
Priority:	<div><div>High</div><div></div><div></div><div>Low</div></div>		
Supporting evidence:	CM		
History:			
Date Created:	03.02.13	Date Reviewed:	25.04.13
Changes:			

Figure.7 Requirement I007

Requirement ID:	I012	Category:	Information
Description:			
Collect customers perception on the freshness of food sold in the coffee shops.			
Rationale:	Customers value freshness of food To understand this the coffee shops should elicit these requirements from the customers so that they can deliver a level of freshness expected by the customers.		
Priority:	<div><div>High</div><div></div><div></div><div></div><div>Low</div></div>		
Supporting evidence:	CM		
History:			
Date Created:	03.02.13	Date Reviewed:	25.04.13
Changes:			

Figure.8 Requirement I012

Figures 7 & 8 are two more information requirements that have been extracted from the small section of the conceptual model in Figure.5. The process of deriving information requirements from the conceptual model can be seen as requirements driving requirements. This is due to the nature of SSM, the root definition used has been developed from the requirements of the students and staff, these information requirements are then derived through the conceptual model that has been built from those requirements. Information requirements are key for decision making, the information can be used to inform decisions and to assess that the coffee shops are meeting the needs of the customers. Over the long term, information requirements can be used to understand how customers needs change over time, this can be fed into the decision making process so that over time the coffee shops can evolve to meet the changing needs of the customer base.

Requirements

As a foreword to these requirements one would like to state that there has been a lot of emotion expressed by the subjects involved in this study around the coffee shops. Many of the subjects, both students and staff, view coffee shops in an holistic way and see them not just as places that provide a service but as something that is to be experienced. There are requirements in this document that reflect the “*intangible*” nature of human experience. Perception is very difficult to express over a wide demographic such as can be seen in Cardiff University. Perception is a critical element to the way humans experience their world and this project has aimed to develop an overall “best fit” set of requirements given the number of participants involved in the study.

The requirements management procedures that has been used for the set of requirements was defined in section 3 of the interim report. Also defined where the quality acceptance criteria that have been in-forced on to the requirements defined in this document.

The requirements of the coffee shop have been sorted into a number of categories:

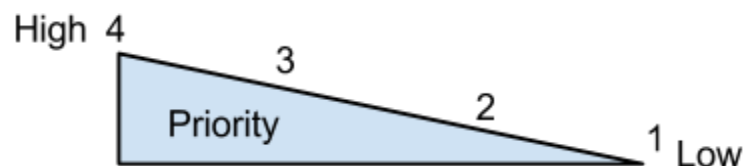
Environmental	Environmental requirements are all those to do with the physicality of the coffee shops. These include the coffee shops themselves, the seating areas that accompany them and all that is involved in providing the customers of the coffee shops with a place where they can enjoy the services provided.
Product	Product requirements are those that specify what the customers want and expect in terms of the products sold in the coffee shops. These include all that is sold in the university coffee shops.,
Quality	Quality requirements are those that specify what customers are looking for in terms of product quality.

Service	Service requirements pertain to those that deal with customer service. These also include higher level services such as opening times and product availability.
Information	Information requirements are those that deal with the information that is needed to be collected by the coffee shops from their customers.

All of the requirements defined in this document are evidence based, this evidence is referenced in the “Supporting evidence” column. The documents that they refer to can be seen in the appendices. The system used to reference this evidence is as follows:

- MC - refers to the meaning condensation analysis documents. The student meaning condensation file is Appendix 2, and the meaning condensation file for the staff interviewers can be viewed in Appendix 3.
 - There references take the form of: “MC.Q4.FG_1”, “.Q4” refers to the question in the meaning condensation document and “FG_1” refers to the focus group number where a subject has stated there need. When referring to the staff interviews “FG_” is replaced with “INT_”.
 - The Students meaning condensation has the FOQ: from other questions section that is referred to as: “FOQ” in the reference.
- INX - refers to the index of points analysis that was performed on the focus group sessions. This document can be seen in Appendix 4.
 - The reference takes the form of: “INX.Q7 (Food)”. The “.Q7” represents the question number where the evidence is situated and the “(Food)” represents the section that the evidence is in.
- CM - Conceptual model, this can be viewed in Appendix 1

The requirements ‘Priority’ field is on the scale of:



The set of requirements that are listed in this document can be seen as they are represented in the requirements base in Appendix 5.

Environmental

ID	Description	Rationale	Priority	Supporting evidence
E001	The coffee shops should offer a level of comfort that students, staff and	In all of the focus group sessions the "issue" of comfort in the coffee	4	Student focus groups MC.Q4.FG_1,2,3. Staff interviews

	members of the public have come to expect.	shops was raised; the participants take this very seriously. Comfort is a major factor determining whether people like a coffee shop or not.		MC.Q2.IN_1,2. Staff interviews MC.Q4.IN_1,2,3,5,6.
	E002 Coffee shops should be clean at all times.	Students and staff all value cleanliness when they visit coffee shops.	4	Student focus groups MC.Q3.FG_1. Staff interviews MC.Q2.IN_1,2,4.
	E003 The environment of the coffee shops should facilitate social interaction by offering comfort.	Students understand and value that coffee shops are social spaces. Students would like for there to be a focus on social interaction in the coffee shops.	3	Student focus groups MC.Q3.FG_2.
	E004 The environment of the coffee shops should smell of roasted coffee.	Smell is a big part of the sensory experience of a coffee shop. Students and staff mention that they are very fond of the smell of coffee when they go to coffee shops outside of the university.	3	Student focus groups MC.Q2.FG_2. Staff interviews MC.Q2.IN_3.
	E005 Provide a relaxing environment	Students and staff alike value relaxation when they are in coffee shops. This is done through a number of ways, through the environment, staff, lighting etc. It was one of the most talked about topics in the focus groups.	4	Student focus groups MC.Q2.FG_3. Student focus groups MC.Q3.FG_1,3. Student focus groups MC.Q4.FG_1,3. Student focus groups MC.Q6.FOQ. Student focus groups MC.Q7.FG_2,3.FOQ. Student focus groups MC.Q8.FG_1,2,3,4. Staff interviews MC.Q2.IN_2,3,4. Staff interviews MC.Q3.IN_1. Staff interviews MC.Q3.IN_3,4.

E006				Staff interviews MC.Q6.IN_3,4. Staff interviews MC.Q7.IN_2,3,6. Staff interviews MC.Q8.IN_3.
	There should be soft furnishings in the coffee shops	A number of students and staff are unhappy with the seating in the coffee shops and would like to see soft furnishing in them.	4	Student focus groups MC.Q2.FG_4. Student focus groups MC.Q3.FG_1. Student focus groups MC.Q4.FG_1. Student focus groups MC.Q7.FG_1. Student focus groups MC.Q8.FG_1. Staff interviews MC.Q4.IN_3,6. Staff interviews MC.Q4.IN_3,6. Staff interviews MC.Q6.IN_3,5. Staff interviews MC.Q7.IN_1,4,6. Staff interviews MC.Q7.IN_2,6.
	E007 Have soft background music	Students would like to have soft background music in the coffee shop so they can relax.	2	Student focus groups MC.Q2.FG_4. Student focus groups MC.Q4.FG_2. Student focus groups MC.Q7.FG_2.
	E008 Provide a mixture of low tables and sofas	People like to have a choice of a variety of different seats, sofas and tables when they go into the coffee shop. This is because people have differing needs, some go alone to coffee shops, some go in a group.	3	Student focus groups MC.Q3.FG_1. Student focus groups MC.Q4.FG_3. Student focus groups MC.Q6.FG_2. Student focus groups MC.Q7.FG_4. Student focus groups MC.Q7.FOQ. Student focus groups MC.Q8.FG_1,3. Staff interviews MC.Q2.IN_4. Staff interviews MC.Q4.IN_6. Staff interviews MC.Q7.IN_1,2,6.
	E009 Provide tables that people perceive to be of good	Students and staff alike feel that quality is	3	Student focus groups MC.Q3.FG_4.

E010	quality	important and they value quality of furnishings when they go to a coffee shop.		Student focus groups MC.Q4.FG_1,3. Student focus groups MC.Q6.FG_3. Student focus groups MC.Q6.FOQ. Staff interviews MC.Q7.IN_1. Staff interviews MC.Q4.IN_6.
	The coffee shops should have their own identities. They should differ over the academic schools which they serve and from the rest of the university.	Students value uniqueness and individuality, the same is true for the environment. Students would like the coffee shops in the university to have there own character and reflect the departments they are in.	2	Student focus groups MC.Q4.FG_2. Staff interviews MC.Q3.IN_1.
	Coffee shops should have aspects of both a convenience store and a coffee shop.	Students and staff all value the convenience that is offered by the coffee shops. They think that it is possible to have the best of both worlds. Coffee shop and convenience store within the university.	4	Student focus groups MC.Q6.FG_1. Student focus groups MC.Q7.FG_1. Staff interviews MC.Q3.IN_2,5. Staff interviews MC.Q5.IN_1,3,4,5,6.
	Plan out the seating to maximise space.	Students do not like the to feel claustrophobic, they enjoy coffee shops that are well panned out so that it feels spacious	4	Student focus groups MC.Q6.FG_2. Staff interviews MC.Q2.IN_6. Staff interviews MC.Q3.IN_2. Staff interviews MC.Q7.IN_2. Staff interviews MC.Q8.IN_4.
	Make it clear where customers have to pay to avoid confusion using sings.	Students and staff have expressed that they find that some of the coffee shops are confusing and not well planned out or sign posted.	3	Student focus groups MC.Q6.FG_4.
	Provide a quiet environment where people are able to study	Students and staff think that studying in the coffee shops in is important. This should not, however be the main focus of the coffee	2	Student focus groups MC.Q6.FOQ.

		shop environment.		
E015	Provide TV's showing news in the coffee shops. With or without volume.	There were a number of students in the focus groups who would like to have TVs in the coffee shops. It was mentioned that the TV volume could be distracting and therefore the TVs should be on silent mode.	3	Student focus groups MC.Q4.FG_2. Student focus groups MC.Q7.FG_2. Staff interviews MC.Q6.IN_6.
E016	Provide modern furnishing and decor.	Students like coffee shops with modern environments. There was a number of the students who expressed negative emotions in regards to the coffee shop environment and how it is dated.	4	Student focus groups MC.Q7.FG_2.
E017	Provide lighting that is suitable for both relaxation and reading.	Some students dislike the harsh light that is in the coffee shops. Others like it bright, there has to be a balance.	2	Student focus groups MC.Q7.FG_3. Student focus groups MC.Q8.FG_3. Staff interviews MC.Q7.IN_3.
E018	Have coffee shops in libraries where possible	A number of students and staff expressed their wish to have a coffee shop in a library. Students have seen this in other universities and really liked the idea of it.	1	Student focus groups MC.Q7.FOQ. Staff interviews MC.Q6.IN_5.

Table.5 Environmental Requirements

Product

ID	Description	Rationale	Priority	Supporting evidence
P001	Coffee sold in the shops should be made by a barista.	There is a high percentage of participants of the questionnaire that indicated their	1	Questionnaire "Cardiff Coffee Shops".

		preference of a barista over a coffee machine		
P002	Have a range of healthy food options	Students like having the option to buy healthy food in the coffee shops.	2	Student focus groups MC.Q7.FG_4. INX.Q7 (Food). Staff interviews MC.Q5.IN_2.
P003	Sell paninis	A number of student mention that they would like to be able to buy paninis from the coffee shops.	3	Student focus groups MC.Q7.FOQ.
P004	Sell a range of pastries that are popular with the customers.	Students and staff mentioned that they enjoy pastries when they go to coffee shops off campus. They would like to see some sold in the coffee shops.	3	Student focus groups MC.Q2.FG_1. Student focus groups MC.Q7.FG_1,4.
P005	Sell a range of cakes.	Cakes are very important in coffee shops, the students and staff have made that clear. Therefore having a range of them is important.	3	Student focus groups MC.Q2.FG_4. Student focus groups MC.Q6.FG_1. Student focus groups MC.Q7.FG_4. Staff interviews MC.Q2.IN_3,5. Staff interviews MC.Q4.IN_2,5. Staff interviews MC.Q7.IN_5. Staff interviews MC.Q8.IN_5.
P006	Sell a range of different coffees and hot drinks.	Students and staff love variety, especially when it comes to hot drinks. There should be a variety of hot drinks on sale.	4	Student focus groups MC.Q2.FG_3,4. Student focus groups MC.Q4.FG_4. Student focus groups MC.Q5.FG_2. Student focus groups MC.Q8.FG_2. Student focus groups MC.Q6.FG_3. Staff interviews MC.Q6.IN_3.
P007	Sell produces that will appeal to the variety of different nationalities present in the University.	A member of staff made the point that there is not much on sale in the coffee shops	1	Staff interviews MC.Q7.IN_4.

		that reflect the diverse nature of the university. Provide produces that are popular with students from abroad.		
P008	Sell a range of snack food	Staff and students alike enjoy the snack food that is on offer in the coffee shops.	4	Student focus groups MC.Q3.FG_3. Staff interviews MC.Q2.IN_4. Staff interviews MC.Q3.IN_2. INX.Q7 (Food)
P009	Have syrups available so that customers can alter their drinks to their taste.	Students mention that they would like to have the option of altering their hot drinks with syrups.	2	Student focus groups MC.Q2.FG_3. Student focus groups MC.Q7.FOQ. INX.Q6 (Coffee & drinks)

Table.6 Product Requirements

Quality

ID	Description	Rationale	Priority	Supporting evidence
Q001	The coffee shops should sell quality sandwiches	Students and staff have expressed their dislike of the sandwiches sold in the coffee shops. They would like sandwiches that are of quality on sale.	4	Student focus groups MC.Q2.FG_4. Student focus groups MC.Q6.FG_4. Staff interviews MC.Q6.IN_4.
Q002	Have a reasonable balance between quality and price	Staff and students think that there should be a fair relation between quality and price. This relation is very important for the students and staff who were involved in the study.	4	Staff interviews MC.Q6.IN_4. Staff interviews MC.Q2.IN_3.

Q003	The coffee sold must be of quality	Students and staff alike mention that quality of coffee is important to them.	4	Student focus groups MC.Q2.FG_2. Student focus groups MC.Q6.FOQ. Student focus groups MC.Q7.FG_2. Student focus groups MC.Q8.FG_2. Staff interviews MC.Q2.IN_1. Staff interviews MC.Q3.IN_2. Staff interviews MC.Q8.IN_2.
Q004	A range of quality soft drinks has to be sold in the coffee shops	Students mentioned that they like having the range of soft drinks available, especially those who do not drink coffee or hot drinks.	3	Student focus groups MC.Q2.FG_2. Student focus groups MC.Q2.FG_2.
Q005	Sell quality pastry	Students and staff mention their fondness of pastries when they go to coffee shops. There is a particular emphasis on quality.	3	INX.Q7 (Food)
Q006	Sell quality cakes	Cakes are very important in coffee shops, the students and staff have made that clear. Having a quality range is essential.	3	Student focus groups MC.Q2.FG_4. Student focus groups MC.Q6.FG_1. Student focus groups MC.Q7.FG_4. Staff interviews MC.Q2.IN_3,5. Staff interviews MC.Q8.IN_3.
Q007	Sell quality paninis	Students and staff mention quality as being important to them, especially when it comes to food.	3	Student focus groups MC.Q7.FOQ.

Table.7 Quality Requirements

Service

ID	Description	Rationale	Priority	Supporting evidence
S001	The coffee shops should be open when most of the	Opening times represent a big issue	4	Student focus groups MC.Q4.FG_1,4.

	students and staff are in university. 08:30 - 18:00.	for the students and the staff. This was raised over and over again in all of the focus groups and interviews.		Student focus groups MC.Q5.FG_1. Student focus groups MC.Q6.FOQ. Student focus groups MC.Q7.FOQ. Staff interviews MC.Q3.IN_1. Staff interviews MC.Q5.IN_2. Staff interviews MC.Q6.IN_5. Staff interviews MC.Q6.IN_6.
S002	Vending machines should be controlled by the staff in the coffee shops so they can be filled throughout the day.	A level of service is taken up by the vending machines when the coffee shops close. They are often empty and there is issues surrounding change given. These issues were raised by a number of focus groups and interview subjects.	3	Staff interviews MC.Q5.IN_2. Staff interviews MC.Q7.IN_4.
S003	Vending machines should keep up to date.	These issues were raised by a number of focus groups and interview subjects. If the machines were kept up to date they would be more reliable	3	Staff interviews MC.Q7.IN_4.
S004	The coffee shops should be open longer over revision periods.	Opening times are a big issue for the students and the staff. This was raised over and over in all of the focus groups and interviews.	4	Student focus groups MC.Q4.FG_1. Student focus groups MC.Q5.FG_1. Student focus groups MC.Q6.FOQ. Student focus groups MC.Q7.FOQ.
S005	There should be the option of having a mug to drink out of as well as the paper cups.	A number of staff and students dislike not being able to have their hot drinks in a mug if they wish.	2	Student focus groups MC.Q4.FG_3. Student focus groups MC.Q4.FG_FOQ. Staff interviews MC.Q2.IN_5. Staff interviews MC.Q8.IN_2.
S006	Stock vending machines so they do not lay empty	Staff and students do not like that often the vending machines are empty and the coffee shops are not open.	3	Student focus groups MC.Q6.FG_FOQ. Staff interviews MC.Q5.IN_2. Staff interviews MC.Q7.IN_4.

S007	Provide convenience to the customers so they do not have to wait long to be served.	Students and staff all value the convenience that is offered by the coffee shops.	4	Student focus groups MC.Q5.FG_2,3. Student focus groups MC.Q6.FG_1. Student focus groups MC.Q7.FG_1. Staff interviews MC.Q4.IN_3. Staff interviews MC.Q5.IN_1,2,3,4.
S008	Coffee shops should have aspects of convenience store and a coffee shop. A balance that is wanted by the customers.	Students and staff all value the convenience that is offered by the coffee shops. They think that its possible to have the best of both the coffee shop and convenience store.	4	Student focus groups MC.Q5.FG_2. Student focus groups MC.Q6.FG_1. Student focus groups MC.Q7.FG_1. Staff interviews MC.Q4.IN_3.
S009	Have power points so that the customers can plug devices in.	Students and staff all appreciate being able to plug their devices into mains power when they are in coffee shops.	3	Student focus groups MC.Q7.FG_3.
S010	Have a loyalty scheme in place that rewards customers for buying coffee	Students and staff have expressed the value they put on loyalty schemes for coffee.	2	Student focus groups MC.Q8.FG_3. Staff interviews MC.Q7.IN_6.
S011	The coffee shop staff should be friendly and welcoming.	There are a large number of students and staff that value when staff are friendly and welcoming.	4	Student focus groups MC.Q2.FG_4.
S012	There should be free and easily accessible wi-fi in the coffee shops for everyone to use	Students and staff mention that they like coffee shops with free wi-fi. In the university there is wi-fi in the coffee shops but the network is not available to the public. There should be wi-fi accessible for the members of the public who use the coffee shops.	3	Student focus groups MC.Q3.FG_1,3. Student focus groups MC.Q4.FG_2. Student focus groups MC.Q6.FG_4. Staff interviews MC.Q2.IN_1,2,3.
S013	Provide card payment options.	Students and staff expressed their desire	4	Staff interviews MC.Q6.IN_4.

		to be able to pay by card for items.		
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Table.8 Service Requirements

Information

ID	Description	Rationale	Priority	Supporting evidence
I001	Measures of comfort need to be defined given the customer groups.	The activities in the conceptual model define the need for the coffee shops to define measures of comfort so that the coffee shops can be appropriately assessed.	3	CM
I002	Information on the perception of comfort regarding the coffee shops must be collected on a regular basis.	The activities in the conceptual model define the need for the coffee shops to collect information on comfort from the customer groups so the coffee shops can be assessed as to whether they are comfortable to the customers.	4	CM
I003	Measures of how customers feel about the decor and its appeal to the customers have to be defined.	The activities in the conceptual model suggested the need for the coffee shops to define measures to assess the decor in the coffee shops.	3	CM
I004	Information has to be collected from the customer groups on a regular basis as to how the decor of the coffee shops apply to the customers.	The activities in the conceptual model define the need for the coffee shops to define measures to assess the decor in the coffee shops.	4	CM
I005	Footfall information for the coffee shops should be collected to give a sense of the popularity of the different coffee shops and	Customers have expressed their frustration at the lack of readiness when coffee shops are really busy.	4	CM

	inform decisions on the environment.	By gathering this information, informed decisions can be made as to how to best prepare.		
I006	Customer feedback on the environment needs to be recorded periodically.	This is so that the coffee shops are able to understand how customers, expectations change over time.	3	CM
I007	Feedback on product quality as experienced by the customers of the coffee shops has to be collected.	This is so that the products sold can be scrutinised against what is expected by the customers.	4	CM
I008	Information on products that are popular with customers when they are in similar coffee shops outside of university should be collected so that the university coffee shops are selling products that people expect to be sold.	Competitor coffee shops in the city of Cardiff offer products that are popular with the students and staff of the University. These products should be investigated and where possible imitated by the university coffee shops.	3	CM
I009	Customer service feedback for the customer has to be collected.	Students and staff all value good customer service. A number of students expressed their dissatisfaction with the customer service experiences. This information will assert that a high level of customer service can be monitored and maintained.	4	CM
I010	Feedback has to be collected from the customers as to whether they feel they experience friendly customer service in the coffee shops.	Students and staff all value a friendly customer service. They mention that it is a fundamental part of the experience of going to a coffee shop.	4	CM

I011	Information on exam periods and extended opening times of the libraries in the university should be collected to inform the opening times of the respective coffee shops over the university.	Students have expressed their disappointment when the coffee shops are closed when they are in university revising. This is also the case when students finish lectures at 5 or 6pm. They would like the coffee shops open when they are in university.	3	CM
I012	Collect customers perception on the freshness of food sold in the coffee shops.	Customers value freshness of food To understand this the coffee shops should elicit these requirements from the customers so that they can deliver a level of freshness expected by the customers.	2	CM
I013	Methods for assessing customers perceptions of value for money given the products sold have to be defined.	Value for money is important for staff and students. Given this, the activities in the conceptual model define a need to have methods of assessing customers perceptions of value for money.	4	CM
I014	Information for the customers on their perceptions of value for money given the produces sold in the coffee shops has to be collected.	Value for money is important for staff and students, given this. The activities in the conceptual model define a need to collect information on customers' perceptions of value for money.	4	CM

Table.8 Information Requirements

Competitive Forces

In order to understand the competitive market that affects the university coffee shops the researcher has carried out a Porter's five competitive forces analysis. Porter's five forces are:

1. **Threat of New Entrants**

- Profitable markets are very attractive, this can lead to a higher level of threats from new entrants into the market. According to Porter (2008) when new entrants to markets emerge they bring new capacity and desire to gain market share, this puts pressures on price, costs and the rate of investment that is needed to be competitive.

2. **Threat of Substitute Products or Services**

- A substitute in a market performs the same basic function as other products in the market but through different means. For example: Instant coffee is a substitute to ground coffee. Porter (2008) argues that the threat of substitutes exist in all free markets and if there is a high threat of substitute industry, profitability suffers.

3. **Bargaining Power of Suppliers**

- Powerful suppliers are those that are able to acquire more value from markets by charging higher prices. An example of a powerful supplier can be taken from the computing industry with Microsoft's near monopoly on operating systems for the PC market.

4. **Bargaining Power of Buyers**

- Powerful buyers (customers) are the opposite to powerful suppliers. Powerful buyers are seen in markets where there are few buys and many suppliers. An example of this is the milk market in the UK where there are a few large buyers and many suppliers of milk. This means that the buyers of milk can demand lower prices for the product.

5. **Rivalry Among Existing Competitors**

- There are many different forms of rivalry that exists, for example: pricing wars, aggressive marketing campaigns and new product introduction. There can be great intensity amongst rivals within markets, especially when there is high exit barriers. An example of a market with high exit barriers is the supermarket industry in the UK.

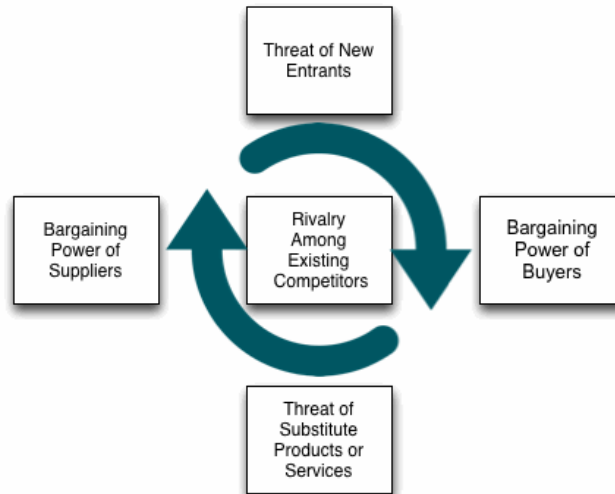


Figure.8 Competitive Forces

Depicted in Figure.9 are the competitive forces and how they relate to one another. Given that Cardiff university is co-located and dispersed like a vein through the center of Cardiff. This means that there is greater competitive pressure upon the coffee shops that operate in the university.

Analysis

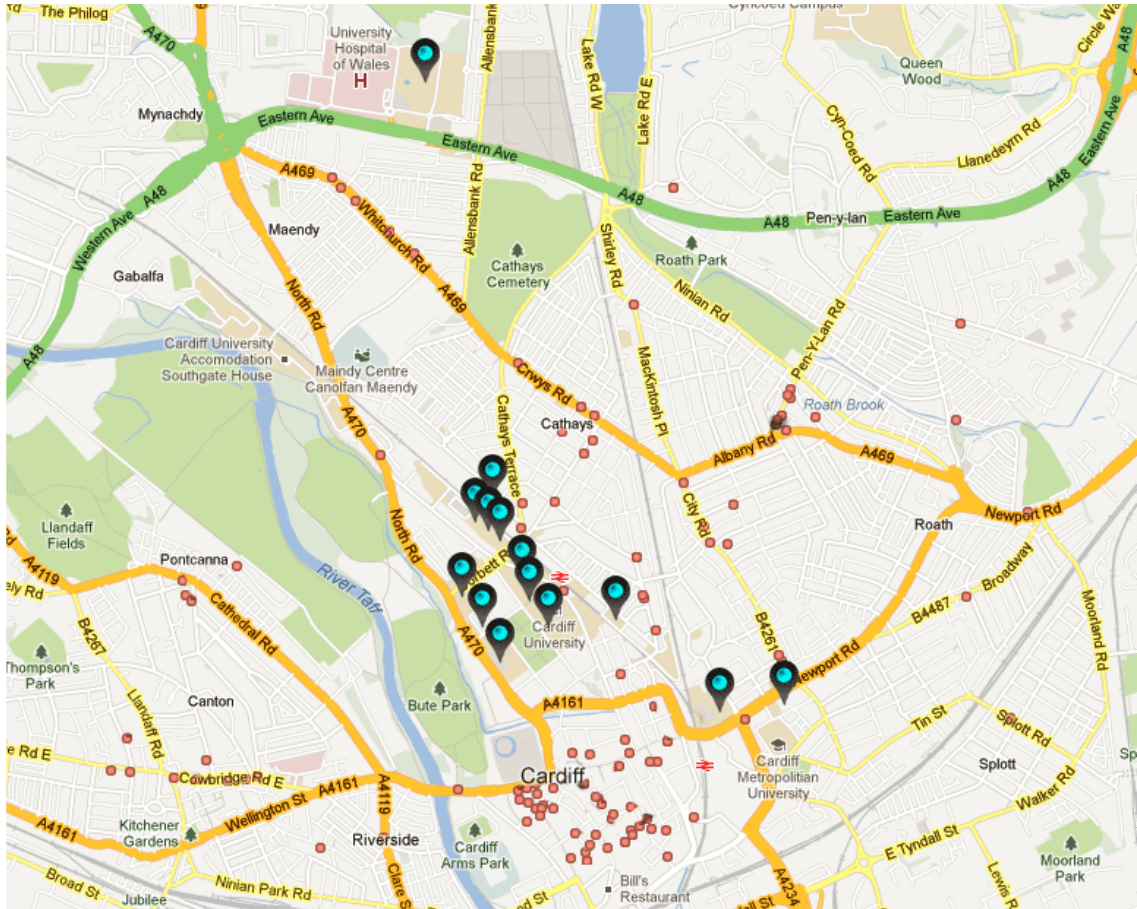
Rivalry Among Existing Competitors

There are a total of 81 coffee shops (Google Maps, 2013) within a mile radius of Cardiff University's main building. One can see the distribution of these coffee shops through the city of Cardiff in relation to those operated by Cardiff University in Figure.10. If one was to add the coffee shops owned by the university to this total then the figure would stand at 95 operational coffee shops in a mile radius of the university. The result of this saturation is that there is a high level of competition among the coffee shops in the city of Cardiff. There is a Costa coffee shop situated within 50 metres of the university main building; this form of aggressive poaching of customers through the placement of the coffee shop, it being so close to the university, is typical of a saturated market. Porter (2008, p.85) argues that such activity is to be expected when there are numerous competitors in a market, he also argues that if there is little to differentiate between establishments, competition over customers is at its greatest due to the

Key

Competitors:

University Coffee Shops:



source: google maps.

Figure.10 Map of Cardiff's coffee shops.

sheer number of similar establishments. This market makeup often leads to aggressive pricing. Quite often, coffee shops sell perishable products such as pastries, sandwiches etc. These products also add weight to aggressive pricing where there is an urgency to dispose of produce. Coffee shops in the University do not have as many perishable stock items in comparison to other coffee chains. For example: Costa Coffee sell a number of perishable items: fresh cakes, pastries, sandwiches, paninis, wraps, fresh fruit and milk based drinks. Whereas University coffee shops (this differs slightly with two coffee shops offering paninis and one offering toast) sell fewer perishable items: sandwiches, wraps, fresh fruit. This means that the need to reduce prices to sell perishable items in the coffee shop is greatly reduced. There is major brand rivalry amongst the coffee shops in Cardiff, with a number of prominent names in the market, such as Costa, Starbucks, Coffee #1, Pret A Manger to name but a few. This will increase the competitiveness amongst the coffee shops and make the market less attractive to non-branded new entrants. Cardiff university's coffee shops do not have anything that resembles a brand or a brand image, therefore they are out of the branding competitive game, this however, does not mean that they do not feel the effect from these branded Leviathans. The United Kingdom (UK) is one of the most brand loving cultures in the world, Bian (2007 p.212) states that the UK is the worlds largest consumer of counterfeit goods. One can make the assumption that given so many Britons are willing to break the law to purchase counterfeit

branded products that they value brands. This has been identified as a requirement in this document. There is, however, one factor that lifts the pressure off the coffee shop market in Cardiff and that is the low exit barriers, property and equipment can be sold off easily.

Bargaining Power of Buyers

There are high levels of power with the buyers in the coffee shop market in Cardiff. This is due largely to the sheer number of coffee shops that one can choose from. In the context of the university this market does have an effect, however, this is dampened by the nature of the university; that is, students often do not have the time to walk into town or cannot be bothered to walk so they use the coffee shops on site. However, the pressure from competitors has been felt with the a Costa coffee on the doorstep of the Main Building and the Students Union on Park Place. Given the spread of the university through the city, it is inevitable that competitors will and have situated themselves strategically so they have access to the student “pie”. As a result, students have greater power to simply go elsewhere with their business, meaning that coffee shops in the university have to work harder for their customers.

Threat of Substitute Products or Services

The threat of substitutes is two fold for the university coffee shops. One being the threat from other coffee shops in the city that offer the same services and more. Two, the threat that lays in products that can be made at home by the students and staff in the university, more so with many staff being able to brew coffee and having the facilities on hand to substitute the use of the coffee shops. The threat of substitutes is high overall in the coffee shop market in Cardiff.

Bargaining Power of Suppliers

Suppliers’ power is low in this market due to large numbers of suppliers; most of the raw ingredients used by coffee shops are commodity products and their prices are relatively standardised at the point of purchase. Cardiff University's Catering and Bars department suppliers are governed by a number of factors; they are vetted by the Higher Education Purchasing Consortium Wales (HEPCW, 2013) and Cardiff University fair trade policy (Cardiff University, 2013). These factors mean that there are less suppliers available to the University coffee shops and as a result, they have more power over them.

Threat of New Entrants

It is very easy to enter into the coffee shop market, this is due to the relatively small amount of capital needed to start up a coffee shop. There is little red tape surrounding planning for coffee shops. The equipment needed is cheap and easy to use. All of these factors make the coffee shop market in Cardiff very tempting to people who are looking to own a coffee shop. The university coffee shops are sheltered from this force to a degree, given that they are in the university and it is not possible for any competitor to set up shop on university property.

Conclusions & Future Work

The aim of this project was to develop a requirements base for the coffee shops of Cardiff University from the students and staffs perspective. This aim has been successfully achieved, and with the use of a number of best practices, that have been defined the requirements are defensibly grounded and truly represent the stated needs of the students and staff.

If one was to continue this project in the future then the next important steps would be reassess the requirements defined by liaising with students and staff over the whole of the university. Although, through this project there has been a number of students involved from almost all the academic school, these have not been even samples, moreover the academic staff involved were all from Computer Science department. In the interest of a broader picture this would have to be done so that the requirements are valid over the institution. Moving forward, one would like contact the participants involved in this study so they can reflect on how they informed the research and identify if there has been any possible misinterpretation by the researcher. A key stakeholder that has not been involved in this project are the members of the public; the public are welcome in the coffee shops, therefore their requirements have to be met. Once the students and staff requirements have been “*fully*” elicited and substantiated over the university then it is imperative that one starts to elicit business and operational requirements from the Catering and Bars department. When both side’s (customers and business) of the coin have had their requirements elicited fully, one would be a position where they are able to re-evaluate all of the requirements given the big picture. When all of the requirements have been defined then one would apply Brian Wilson’s primary task SSM a further time. The resulting model will at this point be truly holistic and represent all that is needed to be done to achieve the requirements given the limitations of the Catering and Bars departments and the university as a whole. If the requirements that are defined are ever to be fulfilled then stakeholder buy-in is essential, to move this project from the theoretical realm into reality stakeholders have to be behind the change process. The most important stakeholder to get on board is the Catering and Bars department, they have control over the coffee shops and it remains with them to implement change.

Reflection

This project has presented a number of challenges, these have been in many different forms, including both academic and interpersonal. The project that was proposed was to develop a requirements base for catering in Cardiff univeristy from a customer’s perspective. At the beginning of the project, there were storm clouds surrounding my thoughts and how I felt about the project, particularly as to whether or not this project was worthy to be called a “*final year project*”. Simply put, I did not appreciate the work and skill needed to produce a set of quality requirements that have a basis in observable phenomena and requirements engineering as a discipline. The research that was carried out at the beginning of the project helped and through

talking with my mentor Prof. R.M Whitaker about my trepidations he helped blow away these clouds. A critical element to this was a peerless book by Klaus Pohl (2010) entitled: "Requirements Engineering Fundamentals, Principles, and Techniques". This colossus, with its 813 A4 pages and 38 chapters was the final nail in the coffin to the thoughts I had that "*This problem is not big enough*". This realisation at the beginning of the project helped motivate me to deliver quality through the implementation of best practices. Just after the initial stage of research I developed a relatively clear idea as to what was needed to be done in the project, it emerged that one of the critical success factors would be my ability to liaise with students and staff. As students and staff were chosen to be the driving force behind the requirements of the coffee shops. Due to the realisation that this project would indeed be much more involved than I had envisaged, I made the decision, supported by my supervisor to narrow the scope of the project to focus on the coffee shops in the University. At the time I felt that focusing on the coffee shops represented a much more interesting landscape to investigate, given the "*coffee culture*" that has emerged in the west over the past 10 to 20 years. My first taste of eliciting requirements from students and staff and indeed my first taste of dealing with the subjects of the study was through the questionnaire that I administered in winter of 2012. This was relatively successful, although there were some difficulties getting participants involved. At the time I felt that the human factor to this project could be its Achilles heel, especially given the prospect of conducting focus groups and interviews. I felt that these elements were out of my control and they could have a major detrimental effect on the project as a whole. Quite honestly, the prospect was daunting to me, the fact that I had to rely on people that I did not yet know for the success of the project. Through producing the interim report, a clear plan of action was defined moving forward into the new year. The plan being to develop and implement both the focus groups and interviews during the spring semester. According to my plan developing, conducting and analysing the focus groups would take 3 weeks, this as plans often do, fell short. The time that it took to develop, conduct and analyse the focus groups was well over six weeks. I was naive to the amount of data that is produced by focus groups and the time it would take to transcribe and analyse the results. This was also true with the interviews, there were a total of 13,322 words of transcribed interviews that were produced, this took a long time to develop. A major issue that I faced conducting the interviews and questionnaires was getting subjects to attend, however, with some "carrot" in the form of incentives such as free food and the offer of a box of tea people were more inclined to attend. Overall the problem of getting subjects to attend, this was not that troublesome and I have developed an appreciation of the importance of interpersonal skills when conducting research. It is all about the people who are involved, they have made this project, and although I felt that this would be a major downfall to the project. It is the fact these people were willing to give their time to me that has made this project a success. If I were to undertake this project again I would not be so trepidatious about the "*people factor*" of the project. Moreover I would embrace it right from the start, as I have come to in this project.

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