Cardiff University School of Computer Science & Informatics

Final Report:
To What Extent can Social Networking Sites enhance the Student Education Experience?
CM0343 - 40 Credits

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Acknowledgements

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Figure 1: Conceptual Overview of the Project Methodologies

Influence Diagram

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Focus Groups

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Interactive Teaching Session

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Questionnaire Analysis

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Sentiment Analysis

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Soft Systems Methodology Application

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Proving or Disproving the Hypothesis
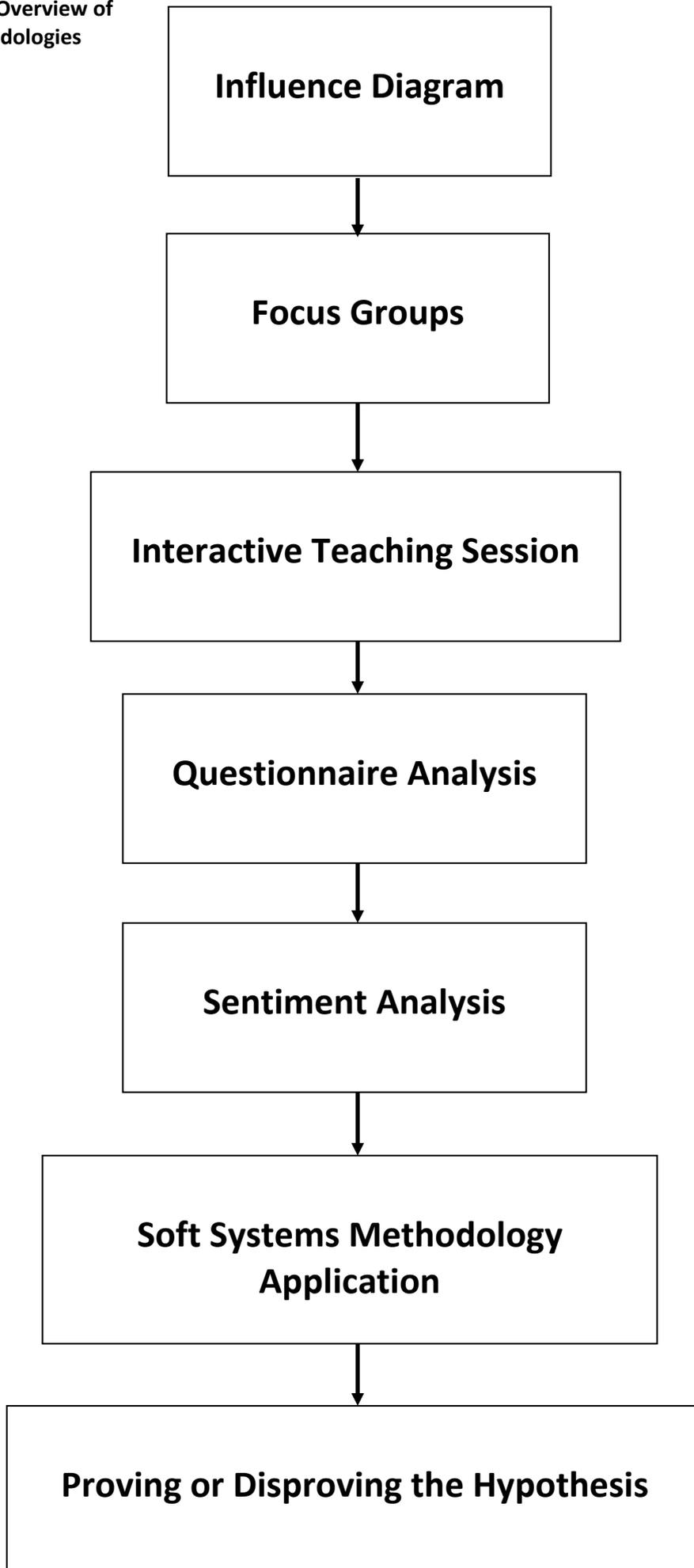
1.0 Executive Summary

This project documentation includes the use of two different systems thinking methodologies, system dynamics for the influence diagram displaying the factors that contribute to the student education experience and soft systems methodology in the form of a CATWOE analysis and conceptual model outlining the steps to implement this type of teaching session if used in the future. In addition, other methodologies include that of focus groups for data discovery, questionnaire analysis in the form of graphical outputs based on feedback data from the teaching session and sentiment analysis delivered for classifying feedback comments from the questionnaire data. A combination of these methodologies provided the ability to analyse, investigate and provide a solution to the problem area being researched.

48% of first year students enrolled on Fundamentals of Computing with Java said videoconferencing was very beneficial within the interactive teaching session.

81% of first year students enrolled on Fundamentals of Computing with Java said this type of supplementary teaching could be used within other modules.

33% of first year students enrolled on Fundamentals of Computing with Java said they were very satisfied with the interactive teaching session.

2.0 Introduction: Summary of Previous Semester Project Work

Based on previous report feedback, there were some comments which have forced the need to have more clarity on particular points discussed within the project. The questions chosen within the questionnaire in particular, the ones relating to learning styles, preferences, suitable modules for the application of social networking site learning were all crucial to the study. The results retrieved from the study not only displayed facts and figures for what was needed to formulate the next stage of the research but in particular they revealed individual's preferences which could then be aggregated to find the most common responses such as module preference or learning styles. In addition, the influence diagram is another element within the study which needed more clarity. The purpose of the diagram is to cover all the variables that affect the student education experience; this includes both internally and externally from the academic environment. The variables were discovered from comments and questions within the questionnaire results but also taken from personal experiences from myself and colleagues which currently affects the student education experience. Obviously the focus of the study is targeted towards how social networking mechanisms enhance the student education experience but it is important to take into account other factors which predominately affect the student experiences within University.

2.1 Introduction: The Basics

The focus of this project documentation surrounds an extension of the research discovered within the previous report. The foundation of the research was formulated within the previous project documentation to reveal an insight into newly joined University students in the form of first year Computer Science students. This initial investigation was crucial to setting the foundation for the study within this semester. It was key to the development of the project to be focused around the preferences of these students, this would ensure the most appropriate teaching session could be devised which would be beneficial for both the students and allow the school to trial a different type of method of teaching content.

This project documentation reveals the complexity of the problem investigated and issues overcome during the development of the teaching session. The methods of teaching during the session focus around three core social networking mechanisms: Facebook, Twitter and videoconferencing but each are individually used for their own purposes to assist with the delivery of the session. Furthermore, each of these individual aspects contribute to formulating the answer to the project hypothesis "To What Extent can Social Networking Sites enhance the Student Education Experience?" and evaluation of the three core components of the study, social networking site usage and purposes, social networking sites used within teaching and learner types and preferences.

2.2 Introduction: Approach Overview

As seen within figure 1, it displays how the different methodologies within the project were synthesized to discover an answer to the stated hypothesis. The following list displays the methodologies used within the following report and an overview of the justification for using these particular methods.

- **Method One - Influence Diagram:** Used to display a conceptual model of interlinking factors which contribute to the student education experience. It was based on personal and course colleague experiences throughout the duration of University.

- **Method Two - Focus Groups:** Used to provide insightful comments from future participants within the teaching session and understand particular structures and preferences to be applied to the teaching session.

- **Method Three - Interactive Teaching Session:** Used as a physical implementation of all the research discovered. Delivered as a means of experimenting with lecture structures, how new social networking mechanisms can be applied and how students benefit from these methods.

- **Method Four - Questionnaire Analysis:** Used to understand both qualitative and quantitative feedback about the teaching session, a means of justifying observations made in the session and answering the project hypothesis.

- **Method Five - Sentiment Analysis:** Used to understand the different positive and negative comments made about the benefits and disadvantages of this session in terms of the student perspective. It provides further knowledge of the qualitative comments made within the questionnaire.

- **Method Six - Soft Systems Methodology:** Used as a review method for restructuring and defining the problem, if the concept was to be implemented within the future. The process is deployed in a reverse way, to understand the problem further after the data analysis.

3.0 Approach: Finalised Influence Diagram
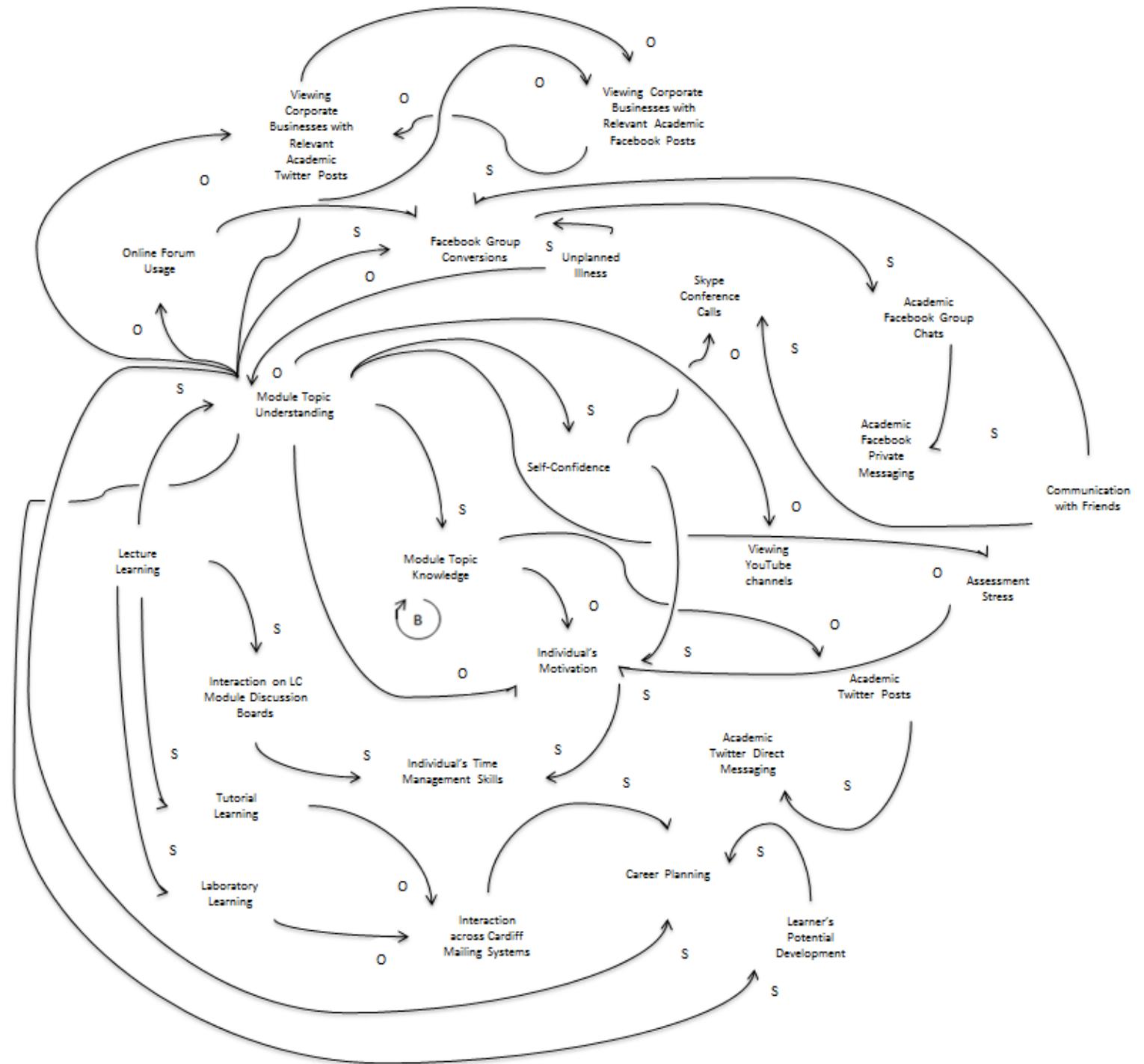
Figure 2: Finalised Influence Diagram

Viewing Corporate Businesses with Relevant Academic Twitter Posts

Viewing Corporate Businesses with Relevant Academic Facebook Posts

Online Forum Usage

Facebook Group Conversions

Unplanned Illness

Skype Conference Calls

Academic Facebook Group Chats

Module Topic Understanding

Academic Facebook Private Messaging

Communication with Friends

Self-Confidence

Lecture Learning

Module Topic Knowledge

Viewing YouTube channels

Assessment Stress

B

Individual's Motivation

Interaction on LC Module Discussion Boards

Academic Twitter Posts

Academic Twitter Direct Messaging

Individual's Time Management Skills

Tutorial Learning

Laboratory Learning

Career Planning

Interaction across Cardiff Mailing Systems

Learner's Potential Development

3.1 Approach: Influence Diagram Variables

The following list displays all the finalised associated variables within the influence diagram (Figure 2). These 25 variables have been derived from relevant terms, concepts associated with the learning procedure and ideas collected within the data retrieval process of the questionnaire results. The influence diagram itself provides a conceptual view of the variables that have been derived from the questionnaire results. It displays what factors affect the student education experience, how these factors interlink and where the social networking elements take place within the student education experience with individuals' academic and professional development.

(1) Module Topic Knowledge
(2) Module Topic Understanding
(3) Individual's Motivation
(4) Self-Confidence
(5) Viewing YouTube channels
(6) Skype Conference Calls
(7) Academic Facebook Private Messaging
(8) Academic Facebook Group Chats
(9) Communication with Friends
(10) Academic Twitter Posts
(11) Academic Twitter Direct Messaging
(12) Career Planning
(13) Individual's Time Management Skills
(14) Interaction across Cardiff Mailing Systems
(15) Laboratory Learning
(16) Tutorial Learning
(17) Interaction on LC Module Discussion Boards
(18) Lecture Learning
(19) Online Forum Usage
(20) Viewing Corporate Businesses with Relevant Academic Twitter Posts
(21) Facebook Group Conversions
(22) Viewing Corporate Businesses with Relevant Academic Facebook Posts
(23) Leaner's Potential Development (Zainuddin S et al, 2011)
(24) Assignment Stress
(25) Unplanned Illness

3.2 Approach: Influence Diagram Variable Explanations

Within Appendix One, it displays individual relationships within the influence diagram and supplementary justifications explaining the relationships.

3.3 Approach: Focus Groups

Focus groups are small structured groups with selected participants, normally led by a moderator. They are set up in order to explore specific topics, and individuals' views and experiences, through group interaction (Litosseliti L, 2003a). Focus groups can be particularly useful as they assist with discovering new information about a particular topic, consolidate old knowledge, obtain multiple perspectives of a particular concept and can gain an insight into ways that different individuals are influenced within a group situation (Litosseliti L, 2003b). This process is crucial for helping to discover the bigger picture of individuals' personal views and attitudes towards the content discussed.

On the other hand, focus groups are not entirely beneficial and can have some potential limitations. In particular, the process can be hard to distinguish between an individual view and what may seem like a group view. This is through manipulation of individuals as some strong personalities may take a leading role in discussions and force others to feel like they need to conform to their responses. Moreover, the results can be difficult to analysis due to the questions being made open-ended (Litosseliti L, 2003c). The concept of planning a focus group can be a difficult procedure; the conductor needs to ensure the correct or suitable numbers of participants attend in order to retrieve the intended data that they want from the study. Litosseliti discusses an appropriate structured way of calculating what inputs need to occur for the focus group can be undertaken as seen within Figure 2 (Litosseliti L, 2003d) below. In my previous report, it discusses the effectiveness of piloting and trialling questionnaires before the official release of the finalised questionnaire. This process is extremely useful in discovering any ambiguous questions or any questions that lacked focused or direction. Furthermore, it is crucial that the focus groups are clear, concise and have open-ended questions for the participants to answer. The research could be prolonged if there are any errors within the official focus groups which could force another one to take place.

Research Purpose?	Research Questions? Issues? Outcomes?	Participants? (Who? Why? Where?)	Moderator? (Who? How?)	Resources? Practical & Ethical Issues? (How? Why?)
				CONDUCT FOCUS GROUP
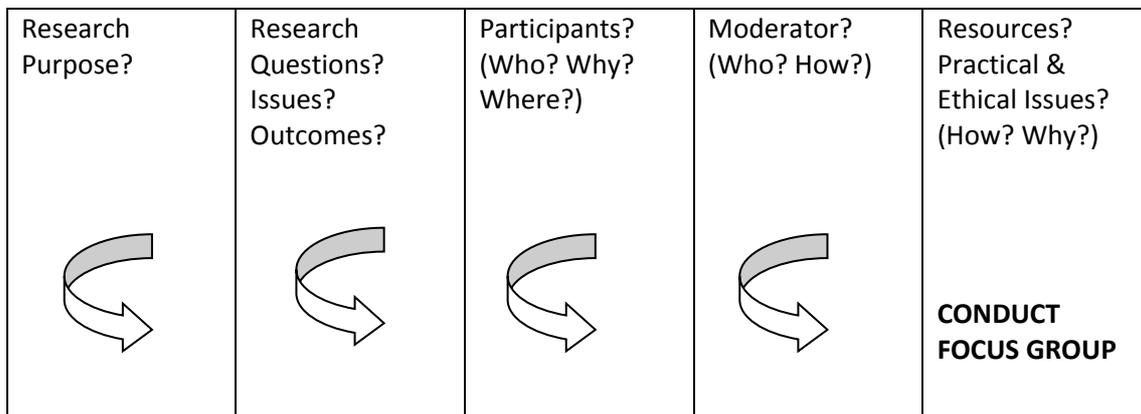
Figure 3: Summary of Focus Group Construction Steps

As previously mentioned, the selection procedure of the participants within a focus is crucial for the conductor or moderator retrieving the relevant data from the correct people perspectives. Moreover, focus groups are normally made up of people with certain common characteristics and similar levels of understanding of a topic, rather than diversity (Litosseliti L, 2003e). This process allows the moderator to ask direct questions which will probe the brain of the participant in a domain that they are comfortable discussing views and attitudes about. Selecting the correct participants and asking insightful questions about the domain, puts both the participant and moderator at ease when responses are fluent and informative.

The selection of the most appropriate participants sets the scene for what type of questions can be asked to retrieve insightful and utilisable results. The participants need to be put at ease during the focus group, the environment needs to feel nature and they should be able to give suitable responses to the questions asked. The structure of the questions asked should appear to be deceptively simple, spontaneous and unstructured, but in reality they are carefully predetermined, sequenced and purposefully open-ended (Litosseliti L, 2003f). The question procedure should appear to the participant that the moderator is trying to probe the brain for all views and opinions on the topic being discussed. Litosseliti discusses a possible question structure which can be seen below (Litosseliti L, 2003g):

Developing and Asking Questions:

- Asking participants to introduce themselves: their name/where they came from/where they live
  E.g. "What is your name and what are you studying?"/ "Tell us your name and what you like doing?"
- Unpacking the concept of the topic being discussed/ different interpretations of the topic
- Identifying and describing change
- Exploring the arguments
- Personal experiences of the topic
- Examining specific arguments about the topic which may currently be in the news
- Summary of the ideas discussed/reflection/additional comments/conclusion to the study

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Figure 4: Developing Focus Group Questions

These questions asked should be clear, focus, include lots of probing but not include 'why' questions as in some cases the participants may become defensive and unwilling to answer these questions due to them feeling they need to justify what they have just given as a response to a question. A typical structure of the focus group would include an introduction to the topic being discussed, start with some opening questions to start the conversation, be prepared to deal with dominant participants and encourage all participants to contribute by suggesting different viewpoints on the topic. Throughout the focus group, constantly probing of different participants needs to occur to gain various viewpoints and finally the session should finish with ending questions, asking for any further comments or responses.

The final part of the study is to analyse the results that were retrieved from the focus group, for this instance, my study included voice recording the focus group as well as taking notes as the interview progresses. Furthermore, the process typically works by sorting the arguments in categories based on the discussion topic and perceptions or potentially categorising based on gender assumptions. Lastly, sorting into linguistic resources, this is based on elements such as time markers, contrast, conviction, vagueness, awareness of the topic and anticipating objection (Litosseliti L, 2003h).

For this particular instance, the aim of the research was to produce a focus group which is designed to clarify any problems surrounding the teaching session and any associated issues surrounding the main concept. Moreover, it gives the interested participants a chance to provide insights on how they would like the teaching session to be run and what methods they feel will work well within the session to develop the data gathered from the questionnaires. The usage of a focus group helps to reinforce the proposed teaching session and make students more aware of the upcoming event. Furthermore, it provides the chance to engage other participants who may not have been originally interested in the concept or

just discarded the concept when filling out the questionnaires in the previous semester. The outcome of the focus group is to formulate the decision on what module to run the teaching session within, either a joint module such as Professional Skills or Developing Quality Software. If the outcome is unanticipated it may result in formulating the teaching session within an alternative module such as Fundamentals of Information Systems or Fundamentals of Computing with Java. Lastly, the focus group structure and questions can be seen within Appendix One. The document contains the format for the session, alongside a supplementary consent form for legality and ethical reasons within Appendix Two. The official focus group took place on Wednesday 20th February with 5 first year students providing views on their own personal experiences with those modules.

Based on the results retrieved from the previous semester, the core data collected contained details surrounding willingness to take part in the session, preference of the delivery method and which module to implement the session within. In relation to willingness to take part, 32.4 % surveyed would be willing to take part in the teaching session (37 people answered the question in this scenario). In relation to delivery method, 50% surveyed would use a synchronised presentation with social media interaction (32 people answered the question in this scenario). As final core point, 30% surveyed answered either developing quality software module or professional skills as their preferred second semester module for the teaching session to be used within (30 people surveyed answered the question in this scenario). Thus, gaining participates within the session is crucial to the success of the research. The communication plan involved initially contacting a small segment of people stating their initial interest through the Cardiff University mailing system, and then looking towards posting in Facebook Groups and eventually direct messaging potential participants.

3.4 Approach: Focus Group Ethics Summary

As mentioned within the previous paper due to various obligatory laws and legalisation, a crucial part of performing the focus group is ensuring that all the questions and viewpoints being discussed are within the ethical limits as viewed by the school. The individual participants are made fully aware of all the usage of their viewpoints, they are requested to sign a disclosure form giving permission for myself to undertaken the study and use recording mechanisms within the session to produce a transcript of the comments made. Therefore, all the items discussed within my study are purely confidential between myself, the school, my supervisor and moderator who are reading the report.

3.5 Approach: Focus Group Pilot Test

As performed within the previous report, pilot testing of any implementation is crucial to understanding how potential users or participants deal with the item they are given to interact with. For this instance, it is essential that the questions being asked within the focus group can stimulate an insightful conversation filled with multiple comments about the topic being discussed. The trial focus group can help outline any questions in particular that lack clarity or retrieved minimal response from the questions being asked.

For this focus group in particular, a pilot focus group was delivered which involved using third years to understand their viewpoints on the topic being discussed. In relation to the questionnaire delivered in the last paper, similar questions are being asked however for this instance they are more open-ended questions to ensure the participant does not feel pressured into answering a particular question in a certain way.

The following list details the students who participated within this trial focus group from the School of Computer Science & Informatics (All transcripts of the conversations can be seen within Appendix Eight):

- Male Student, Studying BSc Information Systems (Year Three)
- Female Student, Studying BSc Information Systems (Year Three)
- Female Student, Studying BSc Information Systems (Year Three)

After a review of all the viewpoints discussed within the trial focus group, there were some particular amendments that needed to be made before the final focus group was released. Participant one addressed the point that the questions were very good but sometimes it was difficult to understand if the questions were requiring an answer from a student or lecturer point of view. This was aspect that needed to be made clearer when introducing the focus group and ensuring the students gave their own perspective of what they would like to see. The job as the moderator was to understand all stakeholders' views and know that when implementing the teaching session it needs to incorporate both viewpoints on teaching. Furthermore, participant two discussed the concept of potentially providing some form of prompt to start discussion points within the session e.g. a version of what the Facebook group would look like with these anonymous profiles. Alternatively, participant three argued against that idea as it could indirectly prompt the participants to focus solely on one type of social networking mechanism and not branch out to other mechanisms. Instead, it was suggested to explicitly state what social networking mechanisms actually are, include definitions of the terms and the proposed mechanisms intended to be used.

Based on the response from third year students, it revealed differences in viewpoints in some cases based on their preferences and perception of the teaching session to be undertaken. A common discussion points surrounded the usage of Facebook, the participants were keen to see its involvement within the teaching session but made it clear that anonymous accounts may be better suited. The preferred option, based on the majority findings, was to allow students to use their personal accounts if they wanted to but provide a specific amount of anonymous accounts for the student to use, if they were not comfortable using their own account within the session. In addition, the benefits of Twitter and videoconferencing within the session were much appreciated as the participants discussed where the usage of these mechanisms has been used within another school. For videoconferencing, it was discussed that the usage could be put to great effect if the correct person from industry was asked to speak during the session. Furthermore, the preferred module, based on their own experiences, for the teaching session to take place would be that of Developing Quality Software. This is due to the fact it can incorporate all the social networking site mechanisms discussed and could be beneficial for providing a real life scenario such as conference calling a professional within industry. A final point of discussion was related to the ability of this type of teaching session to be applicable to multiple modules. All participants were in agreement that this type of could be used across other modules due to the relevance of the mechanisms being used and the nature of the degree schemes. However, it was made clear that this type teaching would be very difficult within other schools and could only be relevant to this school's teaching.

3.6 Approach: Focus Group Data Analysis

The procedure of the focus group can be seen with Appendix One, which highlights all the details of the informative introduction, eight specifically chosen insightful questions and the discussion points. Furthermore, alongside this there is a supplementary consent form

(Appendix Two) used to clarify the details being discussed within the session, the confidentiality of all the details within the discussion and the purpose of the study. Both of these items are crucial for the study as previously used within the questionnaire, it is essential for the participants to feel comfortable participating in the focus group and knowing exactly what their data is being used for. Moreover, the analysis of all the data can be found within Appendix Seven, it contains a comments matrix that uses linguistic resources to highlight particular aspects of the comments and additional a summary of the outlook of the comment based on positive, neutral or negative outlook on the response. The following list displays a summary of the majority of the viewpoints within the focus group, these details are vital for formulating the structure of the teaching as they provide actual future participant preferences:

- CM1202: Developing Quality Software – Thursday 13:10 – 14:00 (T/2.09) move to (S/1.32) could potentially be the confirmed slot for the session itself.
- Facebook group was the main mechanism of choice but considerations should be made that should first years refuse to use the site due to privacy issues
- The students had not experienced this type of teaching before; the closest use of social networking mechanisms within teaching is that of a first year lecturer providing Facebook polls to understand what areas of course content students are struggling to understand.
- One suggestion was to include a text in service used previously within another module. The lecturer has access to a mobile phone which students can use to ask questions that could be discussed within the lecture and all texts were anonymous.
- Videoconferencing would be good, the IBM recruiter had a lot of interest but one suggestion was that the students would not mind who gave the talk as long as the content was interesting and relevant to the content being taught. However, the data transfer speeds and connectivity to Eduroam needed to be considered as a decisive factor in using that mechanism.
- In terms of account types, the use of both personal and anonymous accounts should be used as it provides the option for all participants on what they want to contribute.
- Conflicting opinion on its suitability to other modules based on the content being taught in most cases but depending on people's interest in the first session could cause this type of supplementary to work.

Qualitative data is an extremely useful resource for this instance as it highlights exact viewpoints from the people. The quantitative data discovered from the questionnaire analysis enabled the clear structure of items which could only be analysed from using that data type e.g. what module the first years thought this type of teaching would be within. This type of data reveals exactly what you want from the study and is direct, whereas qualitative provides the precise views needed to construct the session.

The finalised study itself consisted of 5 willing first year students who provided insightful information about their current studying methods within year one. In addition, they precisely answered the questions that were key to producing the teaching session including aspects surrounding social networking mechanisms to use, account types, reaction to this method being used and having a greater understanding of the views on videoconferencing. Obtaining the students for the study itself was difficult initially, the mechanism of discovering the participants was based on emailing through the Cardiff mailing system, student Facebook groups, personal email accounts who showed interest in the last semester and word of mouth from participants interested and asking colleagues to participate as well.

The procedure for the focus group itself was based on all the standards and methods used within the trial session and the research discovered about constructing the session. However, due to the apprehension and nervousness about giving personal viewpoints about current topics within the school, the students needed further prompting for discussion in cases to keep the conversation flowing without putting ideas into their head about discussion ideas. These prompts were mainly used to give a greater insight on what the teaching session would probably consist of and the most similar methods which have been used within my years of my study. For this instance, it was mainly used as a reminder to prompt methods that may have been used previously but the students may have forgotten about. Furthermore, additional conversation was made surrounding usage time on Facebook which was used to relax the students more to make them feel more comfortable speaking the conversation. Another topic of discussion was to give the students more of an insight on the plans for the session, in particular talking about the potential videoconferencing session within the lecture and the approaches to professionals which had been made as preparation for the session. A final point was more to do with clarification, the main question within the focus group that needed answering was that of what module out of the two proposed should use the teaching session. The question was asked earlier within the session but final classification was needed to make sure a majority decision was made.

4.0 Design: Teaching Session Planning

A universal teaching plan relevant for any subject or module at any academic level has been produced (Appendix Four); this provides a structured layout of the objectives of the session, supplementary information required and the appropriate student interactions which I needed throughout the session (TeacherPlanet.com, 2011). Although this standardised teaching plan is not entirely appropriate for this type of teaching session, useful resources from within the School of Computer Science & Informatics will also be used to ensure the session is produced within the regulatory academic board standards. The following items discussed were generated from the questionnaire analysis from the previous semester and the details discussed within the conducted focus group. Accompanying this concept, the focus group needed to clarify if personal social networking accounts were going to be used or will it be anonymous accounts for all the participants within the session, as 75% of respondents said they would prefer to use an anonymous account. This crucial decision could have a bearing on the levels of willingness and interactivity within the session, typically users with anonymous accounts could more likely to interact due to the lack of awkwardness or pressure when answering a question or posting valuable course material.

The initial proposed methods of communications during the interactive teaching session were that of using Facebook, Twitter and videoconferencing as the three main components to delivering this interactive session. The first social networking mechanism being used is that of Facebook through the use of a secret group that only the admin can authorise new members to be added to the group. The communication group named "Social Networking Teaching 2013 (SNT)", it includes all the relevant participants within the teaching session where they could potentially answer questions being put forward by the lecturer, post relevant teaching materials by the lecturer or students and also make use of the poll mechanism to confirm any issues surrounding coursework or exam material. Moreover, based on the questionnaire results from the previous semester, 69.0% of participants wanted to use Facebook within the teaching session, which reemerges the debate surrounding using personal or anonymous Facebook accounts. In addition, for students wishing to use anonymous accounts the following procedure would need to occur: create a spam email account, create anonymous Facebook profiles such as username: COMSC CU1 password: 1234abc, add anonymous profiles to SNT 2013, approve anonymous profile to SNT 2013 and test anonymous profile can post content into SNT 2013. Furthermore, even after the replies from questionnaires and focus groups about the option to have anonymous profile, this option had to be removed after investigation into the Facebook terms & conditions revealing the objection to allow these types of profiles. Further details surrounding this research can be found later in the paper. Thus, using anonymous profiles within this type of experimental could have potentially added more interactivity within the session but it is strongly objected within the terms & conditions of Facebook in particular.

The second proposed social networking mechanism to use within the teaching session was that of Twitter. This would work on the basis of using a designated unique identifier hash tag (#AskSNT2013) which can used to aggregate all the tweets related to content being discussed within the teaching session and placing the data in one place for all participants within the session to have access to the data. Furthermore, this could have be used in as part of the sentiment analysis. This could be particularly useful in terms of analysing the tweets used with the session and any points related to the success or satisfaction of the teaching session, this method can be used in combination with the post-session questionnaire as reaction and analysis to the success of the session. Also, based on the questionnaire results from the previous semester, 37.9% of participants wanted to use

Twitter within the teaching session. This could be due to the ability to post concise tweets about the relevant topics using the hashtag being made public. As part of ensuring Twitter can be used within the session, the unique identifier hashtag (#AskSNT2013) needed to be tested to ensure it was only being used for this topic area and no other topics, was used to separate relevant and irrelevant tweets. Lastly, the proposed option for anonymous accounts within Twitter was considered but again similar to the Facebook scenario, this option was then discarded due ethical reasons and the requirement for users to create a spam email account to register as one time user for the session. If the use of anonymous accounts was to take place, the following procedure would have needed to occur: create spam email account, create anonymous Twitter profiles such as username: @Comsc_CU1 password: 1234a and test anonymous profile can post content with #AskSNT2013. Therefore, Twitter is another innovative social networking tool to be used within this teaching session to delivery short and concise tweets about the content being discussed.

A final crucial component of the teaching session is that of the use of videoconferencing within the session. This would be applied to give an industry perspective to the content being taught, similar to a guest lecture but without the individual having to physically come into the lecture. Moreover, the individual would be talking about topics being discussed within the session and giving an industry perspective of how they can relate to the content being taught within the session. Based on the questionnaire results from the previous semester, 17.2% of participants wanted to use videoconferencing within the teaching session but after further explanations and discussion within the focus group this became a much more interesting teaching mechanism to be applied within the session according to the first year students. In addition, a crucial aspect of using videoconferencing is ensuring the most appropriate individual for the content being taught can be used within the session, they need to deliver value to the lecture and ensure the students can be become engaged with the content being taught. Essentially there were three main types of individuals can could have been considered for the session. Firstly, a professional within industry for the content being discussed within the module, if confirmed to be Developing Quality Software, potentially an IBM employee could talk about recent projects or major projects involving continual team work such as CICS (Customer Information Control System). Secondly, a professional within the recruitment field such as Target Jobs, the Graduate Recruitment Bureau or even careers fayre officers could be used to provide first students information about placement schemes or graduate making them more aware of the future opportunities within the technology sector. A final option was to get in contact with a student who has graduated from Cardiff University School of Computer Science & Informatics and working within industry whether it is a corporate firm or SME, either would still be beneficial. This would work through contacting Mrs S. Huckson, Cardiff School of Computer Science & Informatics Marketing and Communications Officer, to get in contact with a graduate or discovering school graduate through the Cardiff University Alumni on LinkedIn.

Based on further research, the option to use a person within industry or Cardiff School of Computer Science & Informatics graduate were the two options taken on aboard. After contact with Mrs S. Huckson, the option to get in contact with a professional from IBM was considered but also the opportunity to speak to Jennifer Lay, a highly recommended COMSC graduate from the class of 2011 was discussed. However, the option to use a COMSC graduate was later removed to the ability to find a time available for her to Skype within a lecture became difficult due to 9 until 5 busy working hours and timetabling issues. This proposed the consideration to potentially perform a prerecorded interview such as Q&A session, about what she is currently working on within industry, how she got into the position she is in and the experiences she had when applying for graduate jobs but this

would have then removed the interactivity lecture element due the questions needed to be put forward in advance rather than real time questioning. Thus, the decision to use real time streaming using an industry person was decided upon but the allocated module and individual was still under consideration.

A further consideration within the interactive session was to apply other methods to not only gain engagement within the session but have a better understanding of particular students' learner types base on body expressions or individual's learning behaviour. One proposal discussed was the idea of videoing the actual session itself to see what individual interactions within the session are actually like, who is paying attention and if there are any obvious perceptions of people's learning styles based on their activity within the class itself. However, the ethical considerations of the opt out scenario would need to be considered, not all participants may feel comfortable being video recorded and if all participants were happy with it occurring, they would need to be assured that it was only being used for the research project and given to no other parties. Another proposal was to potentially ask five anonymous members who undertook the focus group to be put under study within the teaching session. Furthermore, ask them undertake a learner type check and then discover their levels of interactivity within the session and see if that matches their teaching type. Therefore, both options are good proposals to extent on the current proposed scenario but the ethical issues surrounding both but the first option in particular could hinder them occurring within the session.

In summary, the main three components of the teaching session will involve the use of Facebook, Twitter and Skype. These social networking sites will provide the ability to post and tweet about the content being discussed, provide insightful coursework and revision material, allow polls to be constructed to discover what elements students are struggling with and lastly potentially provide the opportunity for students to pose questions to the individual videoconferencing. Combining YouTube hyperlinks incorporated within Facebook or Twitter could most certainly be used as it gives greater understanding of particular topics if the presentation made it unclear; as a single entity the concept retrieved 44.8% of participant responses wanting to include the mechanism based on last semester's questionnaire responses. As previously mentioned, the extension considerations for learner types could be implemented but the issues surrounding ethics makes it hard difficult to pursue.

4.1 Design: Post-Session Questionnaire Trial

The usage of questionnaires was used to provide some insightful feedback about the teaching session undertaken. This questionnaire was much shorter than the detailed one used within the previous semester. Furthermore, it was based on 12 questions to be used to provide feedback on the mechanisms used within the session, discuss how beneficial particular mechanisms were, provide open answer responses to evaluate the applicability of this type of teaching to multiple modules and how it could be restructured if produced once again. The questionnaire itself provides some feedback that is key to determining the proving or disproving the project hypothesis. If the students within year one are satisfied with the use of this teaching mechanism within the lecture and they feel it has been beneficial within the education experience, then it can be deemed a success. Depending on the level of interest of this type of teaching, it could potentially roll out to other modules but once again it is dependent on the students satisfaction with the process. In addition, the questionnaire combines both quantitative and qualitative data with both types having their own way of being analysed. The qualitative data is based on quantifying qualitative data which be performed through tag clouds or sentiment analysis. Alternatively, the raw

qualitative data surrounds the concept of particularly aspects that went well or did not go so well and also considers the students' opinions on how the session could be restructured to be more beneficial. Similarly, the analysis of this type of data could be performed using a tag cloud again to understand the key points of the statements to discover any common viewpoints.

The construction of the questionnaire was far more straightforward than the one produced last semester. Two questions were taken from last semester's questionnaire; they were used as a further classification mechanism to tie together student's satisfaction with the type of learning used within the session and if that further explains their learner type. Based on assumptions, if a particular student was a visual learner, it would be expected that this type of supplementary learning would be beneficial to them because they can physically see Facebook posts whether it is text, image or link to a video and then take onboard that content to understand topics being taught. In addition, the questionnaire analyses how beneficial each type of mechanism was within the student's learning, this can be used to calculate interactivity levels and if there is one that works really well or does not work so well. Furthermore, the questionnaire is once again anonymous and gives the participant the opportunity to speak openly about the teaching session and not worry about the feedback.

Before the release of the final feedback questionnaire, it was crucial to gain some feedback on the questionnaire to ensure all the questions are relevant and tackle issues that need to be discussed after the completion of the session. The list provides a summary of the comments made by my colleagues within third and second year:

- Sam Jones, studying BSc Information Systems Year Three, stated "Looks really good, Maybe relate or compare your teaching session to a normal lecture or tutorial? Just a suggestion for a question".
- Rhys Batcup, studying BSc Information Systems Year Three, stated "Potentially reword question 6 and 7 to ensure the first year students fully understand what is being asked"
- Brett Stevens, studying BSc Computer Science Year Three, stated "yeah look goods to me. Seems like an adequate amount of questions for a post teaching session feedback, well presented".
- Michael Khong, studying BSc Information Systems Year Two, stated "question 1 are you male or female, maybe say like what is your gender instead and with the how beneficial questions is it 'within' the teaching session or after the teaching session"
- James Foster, studying BSc Computer Science Year Two, stated "Yeah reads fine to me. The questions are short which is good, quick to complete".

These particular issues were taken onboard and considered to ensure the questionnaire was able to be understood by the first years. It provides an alternative perspective to ensure that each question can be answered to give different viewpoints on the teaching session. A common theme was that the questionnaire was a good length and did not push the participant to give any more details than they felt was needed.

4.2 Design: Existing E-Learning Mechanisms

The type of teaching session being considered supports the learning process in a similar way to that of MOOCs (Massive Open Online Courses). Furthermore, at University of Edinburgh, it complements the University's existing online learning offering, providing students with another opportunity to experience a University of Edinburgh education through flexible delivery methods online (The University of Edinburgh, 2013a). The MOOCs programmed as

highlighted at Edinburgh provides a similar concept to that of Online Taught Postgraduate Programmes but still contains many noticeable differences. In terms of the study method, MOOCs provides self-directed. The student follows the course materials, completes the readings and assessments, and gets help from the large community of fellow learners through online forums provided with each course (The University of Edinburgh, 2013b). This learning method is similar to the proposed made within my teaching plan as it makes use of the online community which in this instance could be Facebook, Twitter and Skype. In addition, in terms of the interaction with academic staff, MOOCs offers light touch tutoring; questions are typically answered by the student community in a forum with direction from the MOOC Teaching Assistants (The University of Edinburgh, 2013c). This type of delivery is similar to that of my proposed method whereby the forum is that of a Facebook group, providing a discussion of any course content. The common debate still surrounding MOOCs is that of the content being taught is free in terms of tuition costs and completion of the course does not entitle the participant to have a certificate from that institution. The participant still undertakes a programme and learns the content similar to being taught in postgraduate courses but will not achieve a formal qualification from the institution. Thus, the proposed teaching session provides a similar content to MOOCs but the students are still paying tuition fees, they will obtain a degree at the end of the programme and the content provides a supplement to the content being taught within the lecture.

5.0 Implementation: Teaching Session Delivery and Questionnaire Delivery

The delivery of the teaching session was very much dependent on the involvement of the module leader of Developing Quality Software, Ms. Helen Phillips. The proposals for teaching session needed to match what the lecturer was attempting to teach within the lecture itself. The interactive side of the teaching session needed to be used as a supplement to the lecture itself and not detract from the value of content that the lecturer was delivering. In addition, following a meeting with the module leader, it was concluded that the teaching session should either be delivered on Friday 15th March Week 7 at 11am or Monday 18th March Week 8 at 2pm. Both of these lectures focus on similar topics surrounding team roles and motivation to complete projects which could include social networking mechanisms. However, after changes to the content being discussed within the lecture, a different module (Fundamentals of Computing with Java) was considered put still running the session in week 8 or 9.

The core focus of the delivery of the teaching session was intended to be with Facebook as the main discussion group, this would include YouTube posts, relevant images and discussion questions based on topics being discussed within the lecture itself. Moreover, students will be given the option to add comments to scenario questions or even multiple choice answer questions being asked. Alongside this, the students would have the opportunity to post any other relevant discussion points on Twitter which are short and concise using #AskSNT2013 to collect all the details together within the session. The considerations of videoconferencing or a pre-recorded interview with a professional outside of the academic environment was still in discussion at this point. The development of the session itself, involved reading around the subject to ensure the students feel that participation is two sided from myself and everyone else involved within the teaching session. In terms of the privacy issue once again, my Facebook account was the main admin on the page and the interactions were planned be run through myself due the lecturers not wanting to reveal their own personal Facebook account.

The structure of the session itself planned on including a short introduction about myself, the research area and why this type of session is being performed. This will be followed with the traditional lecture from Ms. Helen Phillips by giving a PowerPoint presentation. Lastly, the session would be concluded with a discussion based on the lecture, it would utilise Facebook polls for multiple choice answer, comments for team discussions and any questions made on the group about the lecture or current coursework issues. The aggregated tweets on Twitter would be scanned through to find any other relevant information about the content being taught or any points for developing quality software which can then be shared with the group. The content of the lecture was planned to discuss Belbin's Team Roles and Team Motivation.

There were various methods considered which could provide a supplement to the content being taught within the lecture. A method that was majorly considered from the initial project outset was that of using videoconferencing such as videoconferencing. This option to use this mechanism would have allowed contacting any well respected professional within industry who has close links to the School of Computer Science & Informatics. There were many difficulties within implementing this mechanism within the session due to this method never being used before within a lecture, as it would normally be in the form of a guest speaker. One issue is the availability of person being contacted and if their availability matched when the proposed teaching session was meant to take place. Another issue is that of the dependence on strong and reliable communication links, the Cardiff University

Eduroam Wi-Fi access can be very unreliable and slow with data transfer due the location of the school sharing with two other major University departments. If the connection is poor, there is no point conducting videoconferencing as the process would be slow and prove pointless due to connectivity issues. Furthermore, the alternative to this option was to provide a prerecorded interview with the individual who could provide an insight into how they deal with project management, team roles and motivation. In addition, they could have provided some background to what they were currently working, their interests and answered any other questions about their position which was prepared by first year students.

The option to allow a post-doc student to videoconference during the session was a very appealing method to allow the students to learn. Dr Martin Chorley, has a BSc in Computer Science from Cardiff University, an MSc in High Performance Computing from Edinburgh University, a PhD from Cardiff University and has had professional experience working on research projects for SocialNets and now on a Recognition project (LinkedIn, 2013). The Recognition project, is based within Cardiff working both as scientific partners, conducting research towards the project goals, and as project managers, providing the coordination and management of all the partners. The project involves collaboration with people at all levels of the project, from the researchers doing the work in labs around Europe, their bosses (lecturers and professors), and the managers within the EU itself. Thus, there are many different areas of team roles which can be explored through using Dr M. Chorley as a resource for speaking about professional experience in relation to the topics being discussed.

After much debate surrounding the way the session could be delivered, a slightly different proposal was considered. The questionnaire and focus group data revealed that the most applicable modules for this module to be used within was that of Developing Quality Software or Professional Skills, after further research it was narrowed down to Developing Quality Software. Moreover, after considering the content that was planned to be taught within the lecture slots and how that content can be used in connection with social networking mechanisms, it proved difficult to find the right balance for what my research outcomes were and what the lecturers wanted to deliver. The difficulty with using Developing Quality Software as the module applying this supplementary teaching method is that the module is 100% coursework and trying to encourage the students to be more interactive is a difficult aspect. The alternative choice was to move to a slightly different module that did not cater for all degree schemes and move it towards one provided just for BSc Computer Science, BSc Joints or BSc Software Engineering. This was in the form of Fundamentals of Computing within Java. Based on the questionnaire research in the previous semester, 36.7% of students wanted to see this method used within that module. This figure was the highest one of interest for a second semester module that not all students within the year group were enrolled on. A similar method would be applied as mentioned within the Developing Quality Software lecture but it would focus more around the content being taught, cover relevant issues surrounding exam material or coursework and intended to make use of Dr Martin Chorley with a Q&A session which can provide insight into how he has used Java within his University projects, research projects and current project he is working on.

The finalised plan was for Dr M. Chorley to deliver a guest lecture alongside the use of an external person from the local tech community (BoxUK representative) joining the Skype session and adding some real-world experience through lecturing and Q&A discussions.

Therefore, performing this as a guest lecture would not disrupt any existing teaching plans and the structure of the session could be more open for discussions.

5.1 Implementation: Facebook Ethics, Twitter Ethics and Intellectual Property

Within the research conducted, anonymous profiles within Facebook or Twitter were a consideration as part of the teaching session. The research revealed that students were happy to use their own personal account but if some student were uncomfortable doing so, the need to provide an alternative anonymous profile would have been useful. Moreover, within the Facebook privacy ethics surrounding these anonymous profiles, it strictly objects to anyone using these profiles as it violates the terms of use. If you use a false name so that you can use Facebook anonymously, your account may be disabled. When a Facebook account is disabled, the user must prove that he did not violate the rules. If you are unable to prove that you were falsely accused of breaking the rules, Facebook may choose not to allow you to regain access to your profile (Webster L, 2013). This makes the process of involving less confident or interactive members within the lecture more difficult. Potentially, these participants could ask a course colleague to post questions on their behalf but from their colleagues account.

Facebook is still in much debate against the anonymous profile concept with many countries around the world but in particular Europe. Recently in Germany, there have been incidents surrounding the usage of anonymous profiles. According to the data protection authority, forcing users to provide their real identities is a breach of German law, under which the country's citizens have the right to use online media services anonymously (Best J, 2013). As previously mentioned, Facebook does not allow these profiles to be created and Mark Zuckerberg is facing a hefty fine of approximately €20,000 due to these allegations. These actions cause Facebook to constantly revise their privacy and ethics statements, however anonymous profiles look to be a subject that Facebook are unwilling to shift on allowing them to be used.

The usage of anonymous profiles on Twitter has a slightly different outlook compared to what is used on Facebook. As stated previously, on Facebook you are required to provide a "real name" which is validated against a list of considered "real names" within the Facebook database and it has to meet that approval to be authorised as a real account. It is possible to change your Twitter name once your account is approved, you can change your first name and last name under Settings>Profile>Name. You must type something in this space, but you can cheat the system and type something generic like "book nerd" as long as it's less than 20 characters (Andrus A, 2011). This allows the user to hide or protect their own identity when using the social networking its, it is could be considered as unethically as it becomes difficult to prove the identity of a user and deriving the difference between a fake and real user.

Intellectual property is another consideration when constructing the teaching session. The original Facebook group used material from lecture content (Phillips H, 2011a & 2011b) produced by Helen Phillips during the 2010/2011 academic year alongside YouTube videos(BelbinAssociates, 2009)(Ts00117381, 2008) and images (Buzzle.com, 2013) which were all referenced within this document giving credit to the authors. Some confusion occurred surrounding the use of lecture slides, however it was made clear that the full slides themselves were not made public, only summaries and discussion points taken from the slides. Secondly, the content being used was slightly out-of-date and therefore was not entirely useful for any third party which may wish to obtain the details. Lastly, the final most crucial point surrounded the willingness of the individual to take part within the session. The impression that I obtained from the party involved was that by being satisfied with helping

with the construction of the session, they were willing to allow myself to use lecture content as part of the discussion.

6.0 Results and Evaluation: Teaching Session Analysis

In terms of analysis of the teaching session, there are a few main points of interest that needed to be examined. One being interactivity within the session which is analysed using a post-session questionnaire and sentiment analysis. Secondly, the assessment of the learner types within the session. It could be argued that the students who are more active during the session in terms of contribution on Facebook discussion groups, Twitter tweets and listening and asking questions during the Skype could be catergorised as a particular learner type. As part of the using the data collection with the session using Facebook and Twitter and post session afterwards, the ethics of both aspects needed to be checked by the School's ethics officer as it had previously been performed in the last paper. The approval of using the data was sent in a disclosure form to be distributed to participants (Appendix Twelve) and the post-session questionnaire (Appendix Eleven) which were both checked by the School's ethics officer and made available to be distributed. The following list displays the original plan for the lecture:

Activity	Time Period
Pre setup of the session including laptops, monitors, projector and logging into the social networking sites.	4:00-4:10
A short introduction about myself, research area, procedure for the session and introducing the social networking site accounts. Invite the students to start asking questions by posting comments on Facebook and Tweeting using the hash tag #AskSNT2013.	4:10-4:15
Dr Martin Chorley, guest lecturer, delivers the lecture as usual but it is much shorter than the normal lecture to give time for the Skype interactions.	4:15-4:30
A Skype session with people for the external local community speaking (Box UK: Software Consultancy) about their experiences with projects involving Java giving relevant details about their professional project work linking to content being taught. The Skype session with each individual contact at each time rather than a group discussion. There will be two projector screens available one with a wall of questions through Twitter or Facebook and another project with Skype calling being undertaken.	4:30-4:50

Dr Martin Chorley gives a summary of the content he discussed within the guest lecture and the main points from the Skype questions.	4:50-4:55
Finishing with a review of the Facebook posts and Tweets made up of students comments relevant to lecture discussions. Displays any further comments about coursework or exam material such as Facebook polls.	4:55-5:00 (May slightly overrun to 5:05 or 5:10)

**Figure 5: Original Teaching Session Plan**

The interactive teaching session was delivered on Monday April 15th at 4:00pm; the session itself was delivered as a guest lecture which had these social networking site interactions alongside the lecture itself. The main focus was on using videoconferencing to provide greater interactivity and engagement from the students within the lecture but the format of the Skype calls was based on people placing questions within the Facebook group or using the relevant hashtag on Twitter. In addition, alongside this Facebook and Twitter was also open to allow students to posts comments about the session itself or even use it to ask questions about the exam. For example, a Facebook poll was setup to allow students to vote on the areas of the content being taught they were currently having difficulty with which can be used as a formatting tool for future revision lectures. As mentioned within the previous paper, the focus of the study surrounds three key areas: social networking sites usage and purposes, leaner types and preferences and social networking sites used within the teaching.

As part of the study, it provides two different perspectives of thought in terms of how to structure the session. One proposal was to do the session based around the specific content being taught within that lecture and how the social networking mechanisms aid the interactivity within the session. A second proposal was to perform a session based on talking about a summary of techniques used within the module, applying social networking mechanisms to understand any problems, concerns or issues with the project development coursework. By using an external resource, they can then bring in their own experiences within industry, project development skills and team roles. The final decision was to combine a the two types, the teaching session was based on relevant techniques being taught within the module, similar to content based but also provides a summary in terms of speaking to industry professionals to bring all the methods learnt within the module together.

The content within the Facebook group was mainly based on what the students wanted to post within the group, however some of the content has been created before the session as a prompt for discussion. A poll was provided to give (Cardiff University, 2013c) the lecturer, Matthew Williams, more of insight into what parts of the module syllabus students are comfortable with or may be struggling to grasp. This can essentially assist with the formatting of future revision lectures, as it comes from a student perspective in terms of what they want addressed. In terms of the equipment required for the session, the main preparation required was to ensure the wireless connection was strong enough within the room to deliver the presentation, the students needed to be notified that the session required them bringing laptops or smartphones to interact, the room needed to have a projector available to see the conversation on video stream and had the option to include

another projector and laptop to display either the Facebook group or the Twitter feed. The following figure displays the layout of the lecture room for the teaching session to be delivered.

Figure 6: Interactive Teaching Session Room Layout & Components
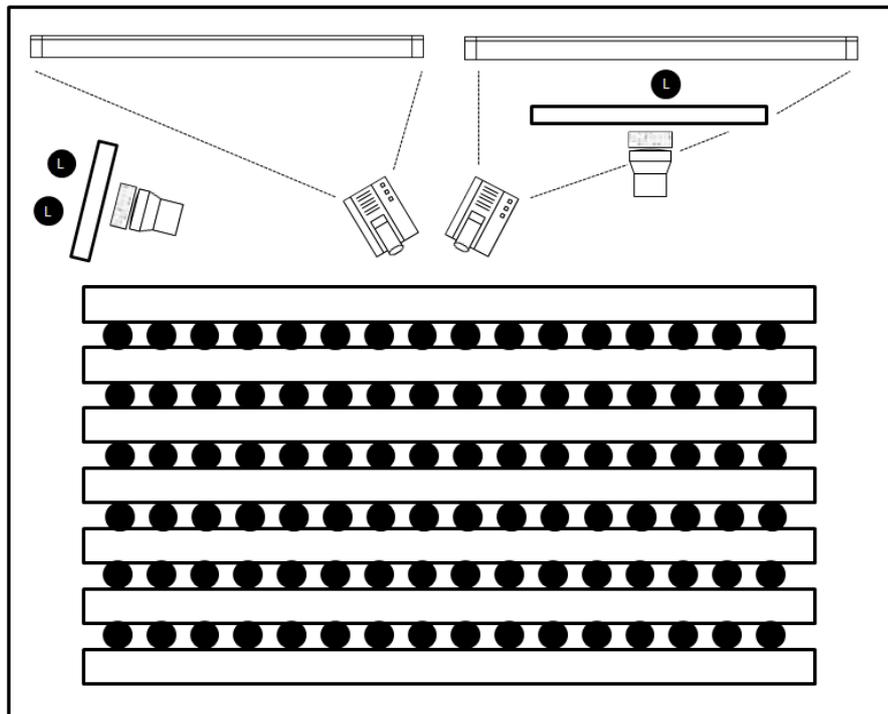
Room Layout Key
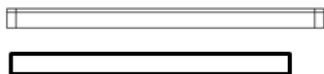
Projector Screen	
Desk	
PC	
Projector	
Lecturer	
Student	
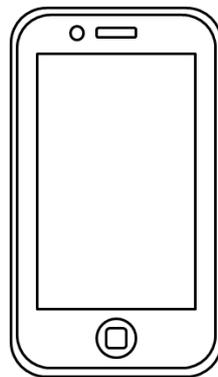
iPhone or Smartphone
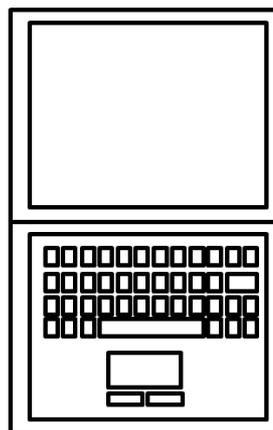
Laptop
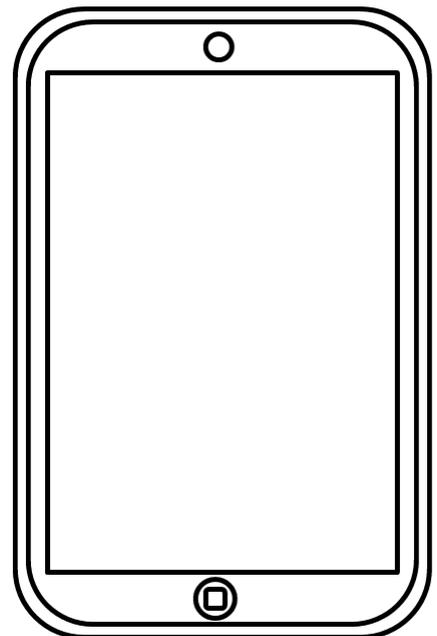
iPad or Tablet

As part of the initial stages of the promoting the session itself, various course colleagues were willing to help with gaining a more reputable hash tag by tweeting details about joining the debate on Twitter or even the Facebook group. Furthermore, involving all participants within the debate was crucial to the delivery of the session. The Facebook group details were distributed by a first year student and lecturer (Mr. M J Williams) to ensure both types of social networking accounts can used within the session. Similarly, the attached hash tag for Twitter users was made available via the email and Facebook group.

The delivery of the teaching session upheld the majority of the structure that was set out within the initial plan delivered to the two lecturers that were formulating the lecture. The actual structure of the session was set out as follows:

Figure 7: Actual Activity within the Interactive Teaching Session

Activity Delivered: Teaching Session Steps
1) Setting up the monitors, laptop connections, Google hangout videoconferencing trials.
2) Initial announcements given by Mr .Mathew Williams about relevant module information.
3) Short overview of the background of my research and instructing students about the relevant social networking sites that were being used within the study.
4) The delivery of the guest lecture by Dr. M Chorley focusing on readable coding code and particular conventions associated with this.
5) Introduction of Carey Hiles from BoxUK, delivered a lecture using Google hangout videoconferencing focusing on conventions used within Box UK and relevant information linked to working in industry.
6) The videoconference lecture finished and then an open question & answer occurred between Martin, Matthew and Carey, used as a method of reinforcing the points that were discussed within both lectures.
7) The question & answer session finished which allowed questions collected over Twitter before the session to then be put forward to Carey.
8) The lecture finished with an open floor question and answer session, available for all students to contribute on the discussion points without using the social networking sites.

Figure 8: Photograph One of Interactive Teaching Session
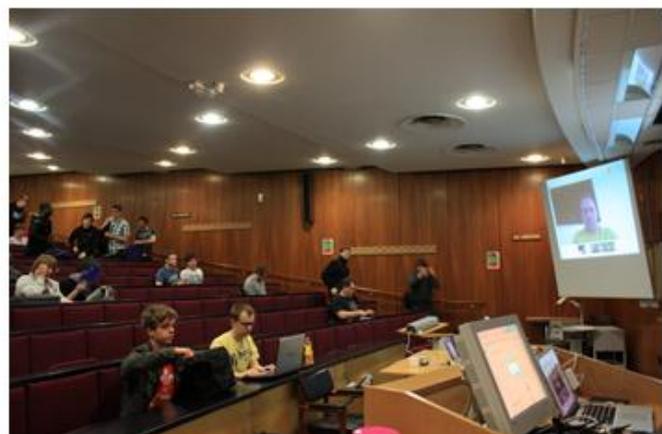
Figure 9: Photograph Two of Interactive Teaching Session

Due to this type of teaching being very much an experimental method, it was unclear how successful the session would actually be. However, success can be defined in two separate ways for this instance. Firstly, all the stages of the planned structure running accordingly and the interaction levels within the session, in terms of the usage the social networking sites being very high. Secondly, if the students actually found the session beneficial to their understanding of the content being taught within the module. Either interpretation of success is relevant for this scenario, however the main part of the study moves towards looking at the second point mentioned.

In terms of the aspects of the session which worked effectively, these included the main bulk of the delivery of the session in terms of the lecture from Dr Chorley followed by the secondary lecture delivered by Carey. This combined the implementation of the traditional lecture style accompanied by a more innovative method using real time streaming of a lecture and not actually just a separate prerecorded lecture delivered via a YouTube channel. On the other hand, there were some aspects of the teaching session that worked ineffectively. The first aspect was that of the minimal interaction using Facebook, it was only used by a very small percentage to state topics within the module they were struggling to understand leading up to the exam period. The second aspect was that of the use of Twitter, before the lecture it was used for promoting the teaching session by myself and fellow colleagues. In addition, course colleagues and friends from outside of the module posted questions which could then be posed to Carey during the teaching session. However, there were no questions tweeted during the teaching session which resulted in discussions from the lectures to be made rather than any questions used within the lecture.

The content of the guest lecture surrounded the idea of the 'good' programming, with the main content being around the idea of writing good readable code and the associated coding conventions. The following content displays the key aspects that were discussed within the short lecture:

- Particular standards that need to be met and shortcuts to these standards.
- Variable and class naming within the code, understanding what variables and methods actually do within the code.
- Clarity of particular items, not needing to read around the item to know what it does.
- Explicitly commenting of the code, documenting and understanding clarity. Idea of only commenting on code that may not appear obvious to the developer.
- Design and refactoring of code
- 'Linting' code, the idea used for checking code for problems and flagging suspicious problems.

The delivery of the guest lecture finished and a representative from BoxUK began to discuss the methods of good programming they apply within industry and the practices they encourages students or graduates to apply. The following questions were part of some of the aspects discussed within the videoconference lecture and also aspects as part of the question & answer session:

- Q: What are your typical standards that you try and get graduates from moving towards? A: Make sure you bring your standards but kept to BoxUK guidelines and ensure someone else can pick up your code based on the code available.

- How often are official guidelines taken onboard? A: Practice styles of coding standards and use them but the BoxUK encourage individual ideas and development.
- Q: How easy is it to write something good or how do you know when code is being written badly? A: make sure it runs correctly. If you cannot understand it within a short-time frame, the code will need to be changed. Other employee's code can be difficult to manage unless using correct coding BoxUk coding guidelines, needed if a temporary employee has been bought to cover someone due to illness or redundancy.

6.1 Results and Evaluation: Post-Session Questionnaire Analysis

Based on the initial reaction from the teaching session, the engagement within the session using Facebook and Twitter was very limited compared to the expected engagement levels but the students appeared very interested in the videoconference. Due to the session only be conducted within one module, it was difficult to get a representation of if this was just an anomaly or it was the general consensus around this type of teaching session being applied within modules. The teaching session itself was conducted on the first day back after the Easter recess, took place late on Monday afternoon and with upcoming first year student deadlines. These factors could all be deemed as major contributors as to why there was limited success with engagement within the teaching session. Furthermore, due to deadlines occurring within all years, this was an aspect that was considered with the delivery of the project. However, due to timing difficulties, it was hard to deliver the session at the right place and right time to potentially optimise interaction levels. Due to the study only being conducted on one lecture cause of the difficulty with applying this method based on the relevance of the content, there may have been a difference in opinion if applied to a separate module or different degree class. However, due to the time constraints with the project alongside other modules, it was difficult to implement within multiple lectures to gain a comparative amount of data to analysis.

Based on the data collected from the school office, there are 96 students enrolled on the module, Fundamentals of Computing with Java. The prediction of the intended response rate was to be around 30%, this was calculated based on the fact not all the students enrolled on the module actually attended the lecture. Compared to last semester whereby the response rate was 38% for the whole of year one, this can be considered as a good response rate target as the segment is smaller and less likely to complete the questionnaire. The actual response rate was 22% (21 out of 96), which considering the amount of assignments and revision for exams occurring at the next start of the final semester, this can be considered a reasonable amount of data.

The first graph (figure 10) displays how beneficial the use of Facebook was for students enrolled on the module and making use of the social networking tool during the teaching session. The majority of the response from the first year students was that the use of this mechanism was only somewhat beneficial at most but mainly slightly beneficial or not all beneficial within the teaching session. The main reason for this response was due to the lack of interactivity of using this mechanism within the session. It gave the opportunity for students to answer poll questions surrounding module topics and also pose discussion points to be used within the lecture. However, due to a lack of interactivity or even one individual starting the discussion, this resulted in minimal usage of the Facebook during the discussion.

How beneficial was the Facebook discussion group within the teaching session?

Extremely beneficial   Very beneficial
Somewhat beneficial   Slightly beneficial
Not at all beneficial

5%   14%
29%
14%   38%
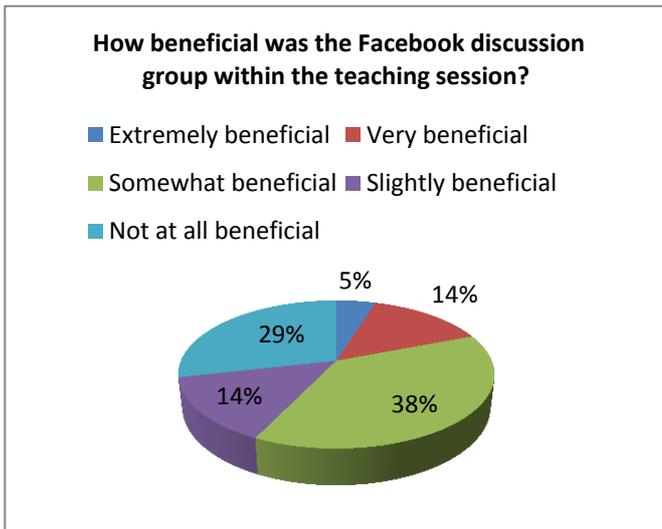
Figure 10: Graphical Pie Chart of Facebook Data

How beneficial was the use of Twitter within the teaching session?

Extremely beneficial   Very beneficial
Somewhat beneficial   Slightly beneficial
Not at all beneficial

0% 5%
38%   38%
19%
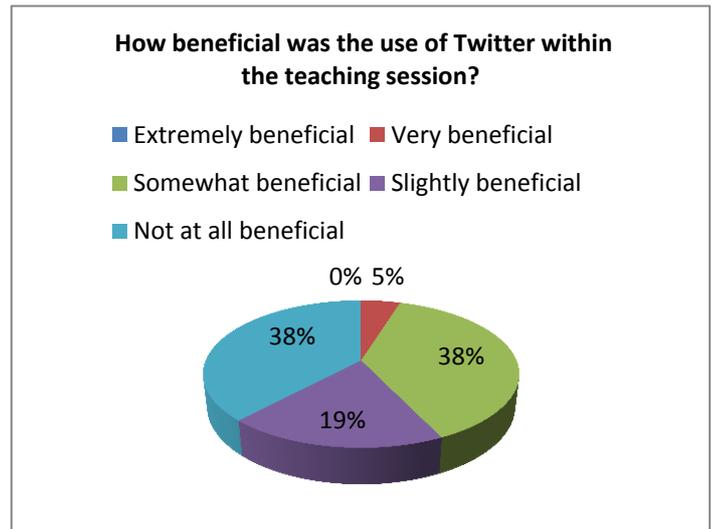
Figure 11: Graphical Pie Chart of Twitter Data

The second graph (figure 11) similarly displays how beneficial a particular type of social networking mechanism was within the teaching session, for this instance it was that of Twitter. In terms of how beneficial Twitter was within this session, it seemed to have limited success. As the graph above displays, there were varied opinions on how useful this mechanism was within the teaching session due factors such as some students not having Twitter accounts and the restrictions on how much can be asked using that mechanism due to the restriction to 140 characters.

The third graph (figure 12) displays how beneficial videoconferencing was within the teaching session, this appeared to be the most beneficial aspect of the session itself as the students genuinely seemed interested in the content being provided by the representation from BoxUK. According to the data retrieved, 57% of the students surveyed stated that they found the usage of videoconferencing to be very beneficial and above. This displays the fact that if the teaching session was to be replicated, this is the one mechanism that the foundation of the session should be focused around as the students found it to be the most useful social networking mechanism. Videoconferencing is a particularly useful mechanism as it allows multiple speakers to be included within a conversation without physically needing to turn up to the lecture. However, the module leader needs to be aware that including too many participants can overcomplicate the proceedings of delivering an innovative style of teaching.

How beneficial was the use of videoconferencing within the teaching session?

Extremely beneficial   Very beneficial
Somewhat beneficial   Slightly beneficial
Not at all beneficial

0% 9%   19%
24%
48%
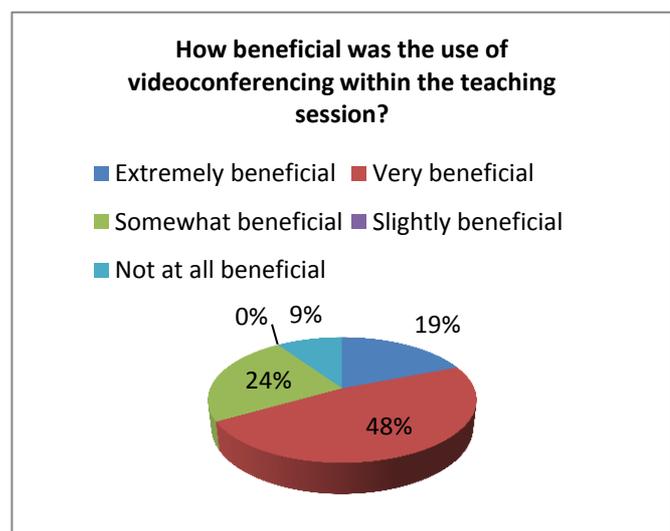
Figure 12: Graphical Pie Chart of Videoconferencing Data

The following image displays a tag cloud (Tagcrowd, 2012) surrounding the particular aspects which the students thought benefited their understanding of the content being taught through using these social networking mechanisms. The words included display the top 25 most frequency used words based on the data collected from the answer to question 6. Within the tag cloud, the removal of terms such as none, no or n/a were taken out from the segment as the question focused more towards particular aspects that were actually beneficial in aiding the students to understand the content being taught.

Figure 13: Tag Cloud of Beneficial Aspects of the Session

The segment below displays a selection of some of the responses which the students thought did not enhance their understanding of the content being taught through using these social networking mechanisms. Similar to the items discussed above, some of the responses contained terms such as none, no or n/a, which were not considered for this analysis. The focus of the question was aimed to finding the negative aspects surrounding the delivery of the session. Furthermore, some of the responses focused around the concept of not seeing how the application of Facebook and Twitter was beneficial to the teaching session. For example, **"Other than Google hangouts, not sure what Facebook and twitter added"**, **"People didn't really seem interested in the twitter or Facebook questions"** and **"No one appeared to use the Facebook group and only a few people tweeted questions before the lecture"**. This gives pointers for reconsidering what mechanisms should be used if the teaching session was to be replicated within other modules. In addition, to these points discussed, there were some concerns about how the students were informed about the session procedures before the delivery of the session. For example, **"More content was needed to help with the lecture"** and **"Nobody seemed interested in posting questions"**. This factor was difficult within the preparation to delivering the teaching session due to the fact, the session needed to remain unstructured to some extent in order to encourage engagement. Furthermore, this was a teaching method that had not been trialed within the school before, so the element of surprise in terms of the mechanisms being used within the session needed to be included. Lastly, there were preparatory details about the session supplied through the Facebook group, Tweets on Twitter and disclosure forms distributed by myself and the lecturers. It could have been the case that the students did not actually read preparatory details distributed.

The following graph displays one of the key decision points surrounding whether the application of this type of teaching is suitable for other modules, if it can be seen that the students feel this type of teaching can actually be applied within a single or multiple set of lectures. This is something that could realistically be included within the teaching session and applied within the school for future modules. Based on the data collected, it is very clear that the students found the session beneficial but not all the mechanisms used within the session. However, the clear facts reveal that 81% of the students surveyed felt this method could be used within multiple modules, displaying the fact that this type of innovative teaching is element that could be very beneficial in meeting individual student's academic ambitions and also the ones set by the head of school for each module. Moreover, there was the opportunity for students to provide some reasons why they felt this could be applied to other modules. The tag cloud below (figure 15) displays the 30 most frequently used words retrieved from the responses provided. Some of the key terms revealed from the data highlight the idea of improving interactivity, providing the opportunity for industry perspective on the content being discussed and giving a better understanding of the content being taught.
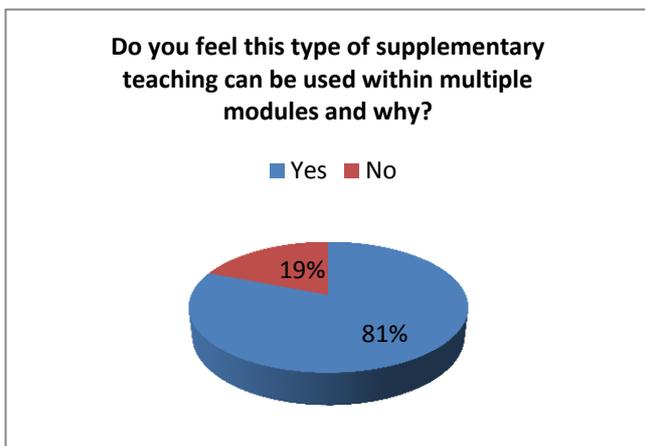

Figure 14: Graphical Pie Chart of Application to Other Modules
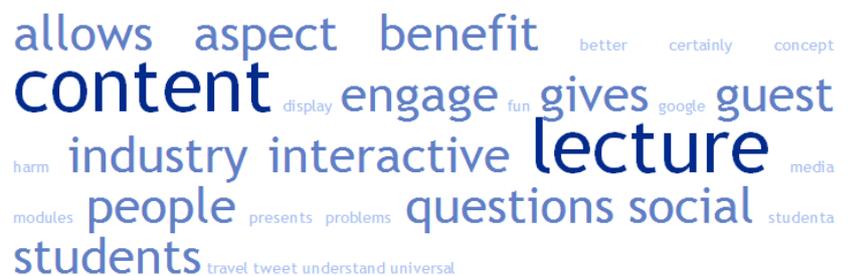
Figure 15: Tag Cloud of Explanations of Why?

Following on from the data analysis, there are secondary points to consider if the teaching session was to be reproduced. There were some comments surrounding not to change the teaching session format at all and some comments that praised the execution of the teaching session but the focus of this question was to gain some more ideas about how the structure of the session could change to improve the delivery, if the concept was taken aboard for other modules. Various improvements included that of using **"More background before hand"** and **"Make people more aware of the discussion mechanisms beforehand"**. These aspects of the session were actually discussed before the lecture and all the aspects of the mechanisms being used within the session were made clear to students but maybe they were not fully aware of how these mechanisms would be applied within the session itself. Another area surrounded that of interaction within the session, **"More interaction between the local and remote (video) speakers"**, **"More interactions/ more opportunities for interaction as there was not a lot of content to be questioned about"** and **"I would have the stream of**

questions live on a screen in the room so we can all see what is being asked”. This is an aspect which is entirely dependent on student participation and surrounds the core idea of why the social networking items were proposed within the teaching, to encourage more interactivity and engagement within the lecture. The main problem surrounds encouraging students to participate in the first place, when multiple students show an interest in participating it will typically encourage others to be involved as well. A final point surrounded a suggestion of even moving away from the social networking mechanisms and providing a website managed by the lecture to policy posts but based on a similar idea of Facebook **“Make a new website so that the lecture and students can have more control on the content that is being displayed. Try not to use generic social media”**. This is an area which distracts away from the point of my study, therefore it was not used for this instance but it may be possible to include it this mechanism if the teaching session was to be repeated in future.

Another core area of the research for this project surrounds the concept of learner types and preferences. This was an aspect that was discussed once again during the teaching session to understand how different students interact within the session, however due to the complexity with monitoring individuals interactions within the session this was not taken onboard. The focus of the study changed to attempting to understand if there was a particular learner type that this method would benefit most. According to the data collected, the majority of students enrolled in the module considered themselves to be either visual (28%), kinesthetic (24%) or multimodal learners (24%). This type of teaching supports the two visual and kinesthetic learners because they focus around the ability to display visual content and be involved with discussions in hands on way. The term visual learner refers to the use words and phrases to visualise idea. Whereas, the term kinesthetic leaner refers to engaging and solve problems using a hands on approach and multimodal, relates to a combination of all the methods discussed and not one particular learner type. This could be one of the main reasons relating to why the social networking mechanisms seemed to be successful to some extent, as it worked to the strengths of the three different learner types discussed and added assisting the students better understand the content being taught.
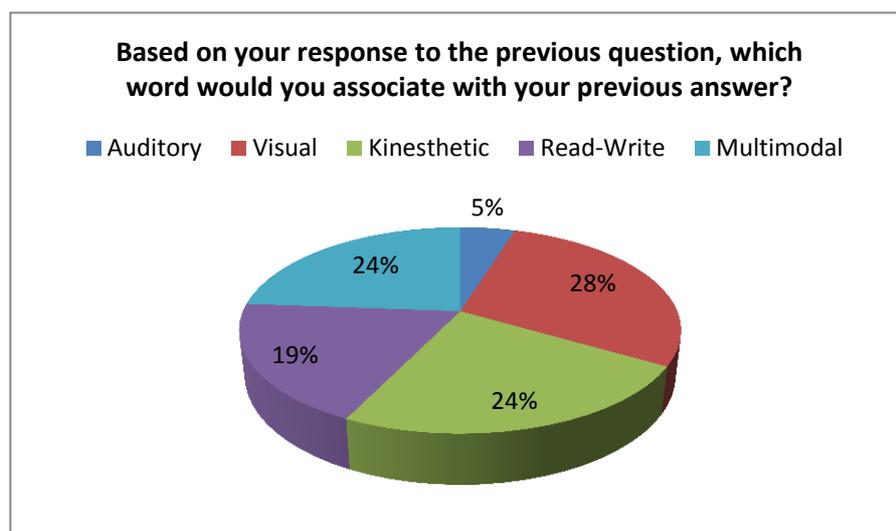

Figure 16: Graphical Pie Chart of Learner Type Data

The final graph (figure 17) displays the satisfaction levels of using this particular teaching method within lectures. This accounts for a conclusion to study and if students enrolled on the module were satisfied with using this type of teaching alongside the traditional learning methods, it could be potentially rolled out onto other modules not just within first year but other years within the school.
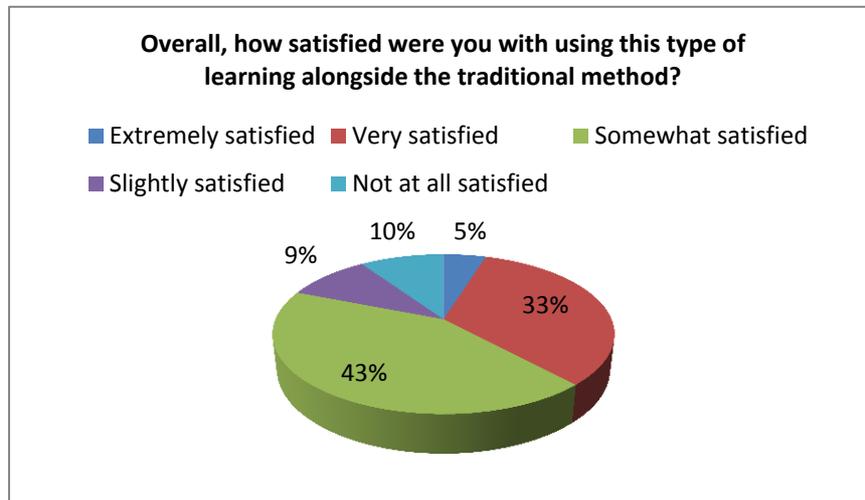

Figure 17: Graphical Pie Chart of Session Satisfaction Data

6.2 Results and Evaluation: Sentiment Analysis

Based on the data retrieved from the questionnaires, the application of sentiment analysis can be applied to classify and understand the comments made about particular aspects of the teaching session. The original plan was to apply the sentiment analysis to both the questionnaire data retrieved and Facebook and Twitter data but as there was not enough data discussed within the Facebook group and the Tweets made using Twitter to make these method suitable to be used. All the posts made on Facebook and Tweets on Twitter related to the project can be seen within Appendix Fourteen. Furthermore, The use of online software, SentiStrength, has been applied which makes use of analysing individual text statements and assessing them against a scale of positive and negative of the strength of these statements. The scale ranges from -1, not negative, to -5 , extremely negative, and the end of the spectrum being 1, not positive, to 5 ,extremely positive (SentiStrength, 2013). The ratings discovered within the analysis are assessed against a given index which contains words with predefined levels of positive or negative ratings. For this particular sentiment analysis, the process is based on sentence based subjective sentiment analysis as each individual answer to the question has been put through the SentiStrength software to classify particular word ratings. The questions that require qualitative subjective answers to be provided e.g. question 6, 7, 10 & 11; this type of analysis is most suited. The application of sentiment analysis is difficult for this scenario, if there was more data that could be used in the form of tweets or posts that would have been more applicable to be used within sentiment analysis process. Within the sentiment analysis, any responses which contained "none", "no" or "N/A" were discarded and not applied within the analysis of the sentences.

6.2.1 Results and Evaluation: Question 6 Sentiment Analysis

Each individual response to the question is seen with a positive and negative rating attached to the answer. For example, the first response in figure 18, has a positive rating of 2 and has a negative rating of -1. This graphical representation is used for all four questions which

have been analysed through SentiStrength. All the questionnaire responses that were analysed through SentiStrength can be found within Appendix Fourteen.

The following answers were given to question 6 "Was there a particular aspect learnt, through the use of social networking mechanisms, that you thought was beneficial to understanding the content being taught?":
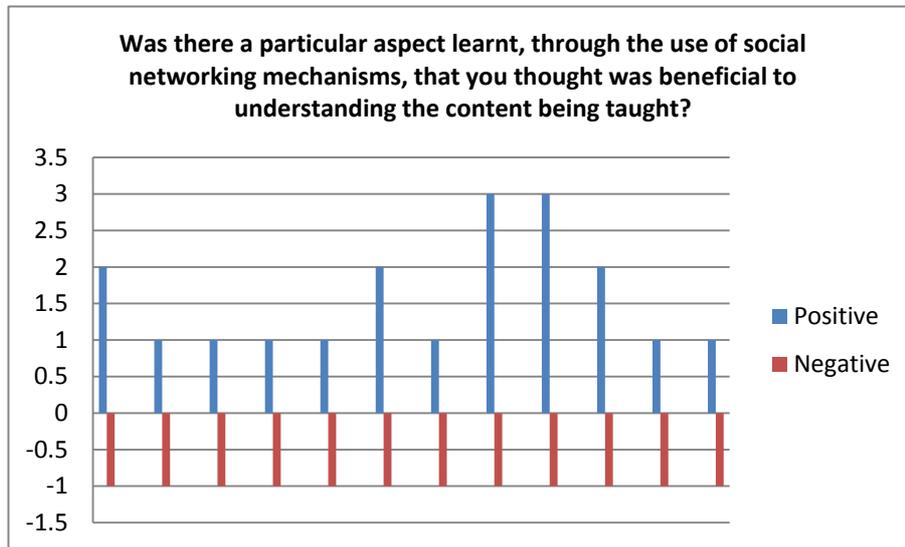
Figure 18: Graphical Bar Chart of Sentiment Analysis Question 6

6.2.2 Results and Evaluation: Question 7 Sentiment Analysis

The following answers were given to question 7 "Were there any particularly aspects, through the use of social networking mechanisms, that did not enhance your learning within the session?:
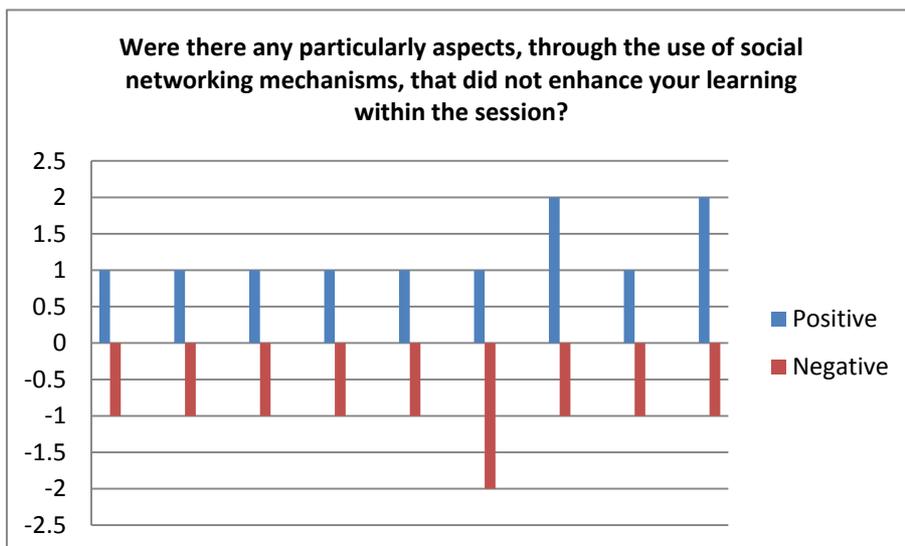
Figure 19: Graphical Bar Chart of Sentiment Analysis Question 7

6.2.3 Results and Evaluation: Question 10 Sentiment Analysis

The following answers were given to question 10 "Do you feel this type of supplementary teaching can be used within multiple modules and why?":
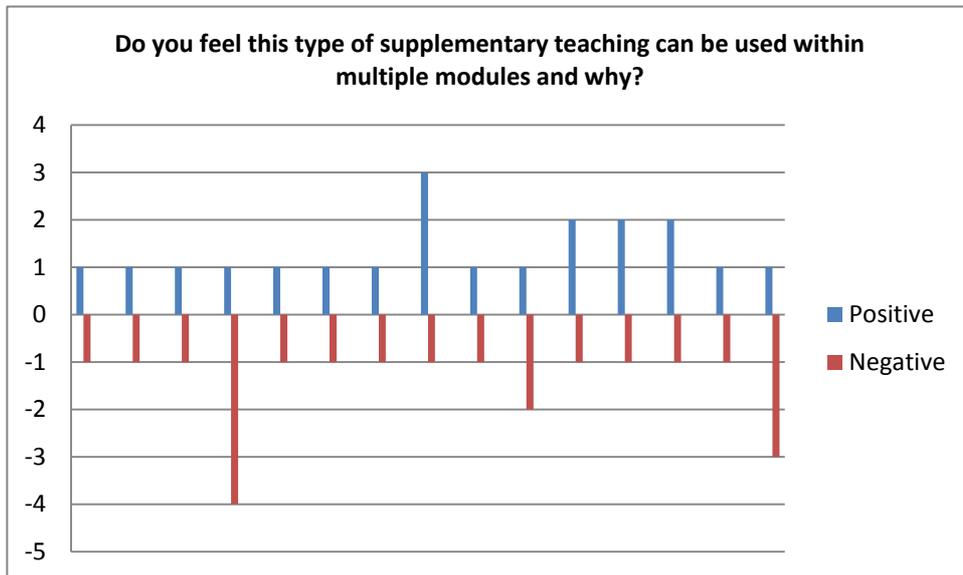

Figure 20: Graphical Bar Chart of Sentiment Analysis Question 10

6.2.4 Results and Evaluation: Question 11 Sentiment Analysis

The following answers were given to question 11 "If this session was to be produced again, what would you change and why?":
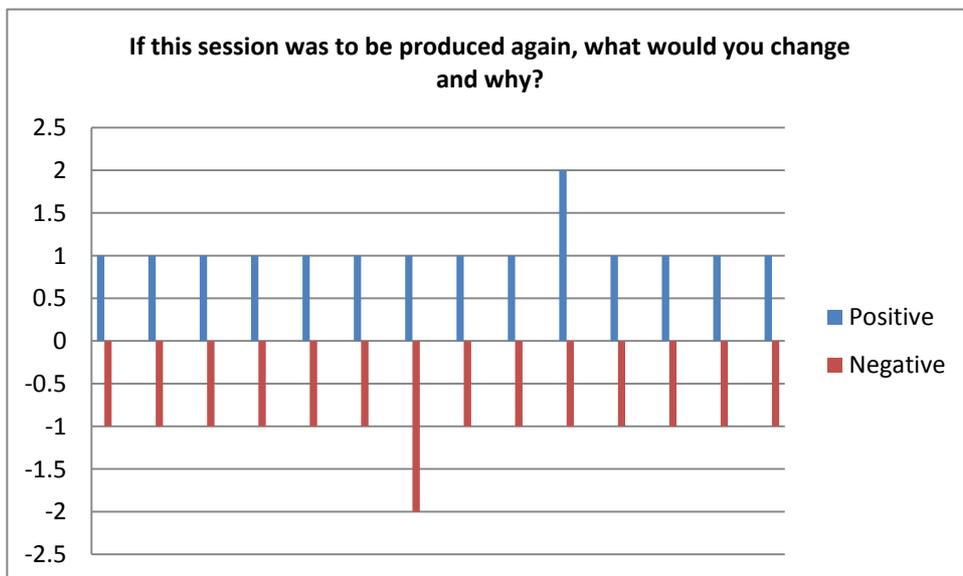

Figure 21: Graphical Bar Chart of Sentiment Analysis Question 11

6.2.5 Results and Evaluation: Sentiment Analysis Summary

Between the four questions that were analysed there were different contexts, in terms of the intention of the question being asked, so the consideration of different sentiment analysis ratings needs to be taken into account. Based on all the data gathered, the range of ratings for positive sentiment vary from 1 to 3, whereas the negative sentiment vary from -3 to -1. After reviewing all the aspects from the data collected from the questionnaire, the outcome of the sentiment analysis provides a balanced reflection of the core outcomes of the teaching session. The satisfaction and beneficial nature of the session was split due engagement with particular social networking mechanisms and student participant within the session.

6.3 Results and Evaluation: Soft Systems Methodology – Root Definition & CATWOE

Based on the data recovered from the questionnaire analysis, the application of SSM can be used to assist the problem solving of this particular topic for future attempts to utilise social networking mechanisms within lectures. The process of using SSM can be used as a blueprint to apply the system for future lectures, if the idea is implemented correctly using the students and lecturers as the focus of the development. The system will then be tailored to what core groups of students and individual module leaders what to perform within the system. The approach taken applies an issue based SSM model based on a single root definition and translating that into conceptual model; the model is based on Wilson's school of thought (Wilson B, 2001). The SSM approach is part of the evaluation in terms of the steps which need to be understood to ensure the design of the session suits the appropriate module. This is based on the findings from the teaching session and previous research within the area of using social networking mechanisms for teaching within the school.

A Cardiff University School of Computer Science & Informatics owned system, implemented by each module leader, designed to enhance the student education experience within lectures for different learner types. Designed through student and module structured requirements for the system and improving engagement within the lectures by applying various social networking mechanisms; alongside the assessment of the success current teaching methods within the School. The system is developed in line with the Head of School's academic ambitions for each module; accounts for lecturer participation and development constraints such as available personnel and equipment.

C: Customers – Students and Staff.
A: Actors – Each module leader.
T: Transformation – Enhance the student education experience within lectures for different learner types.
W: Worldview – Through student and module structured requirements for the system and improving engagement within the lectures by applying various social networking mechanisms; alongside the assessment of the success of current teaching methods within the School.
O: Owners – Cardiff University School of Computer Science & Informatics.
E: Environment – The Head of School's academic ambitions for each module; accounts for lecturer participation and development constraints such as available personnel and equipment.
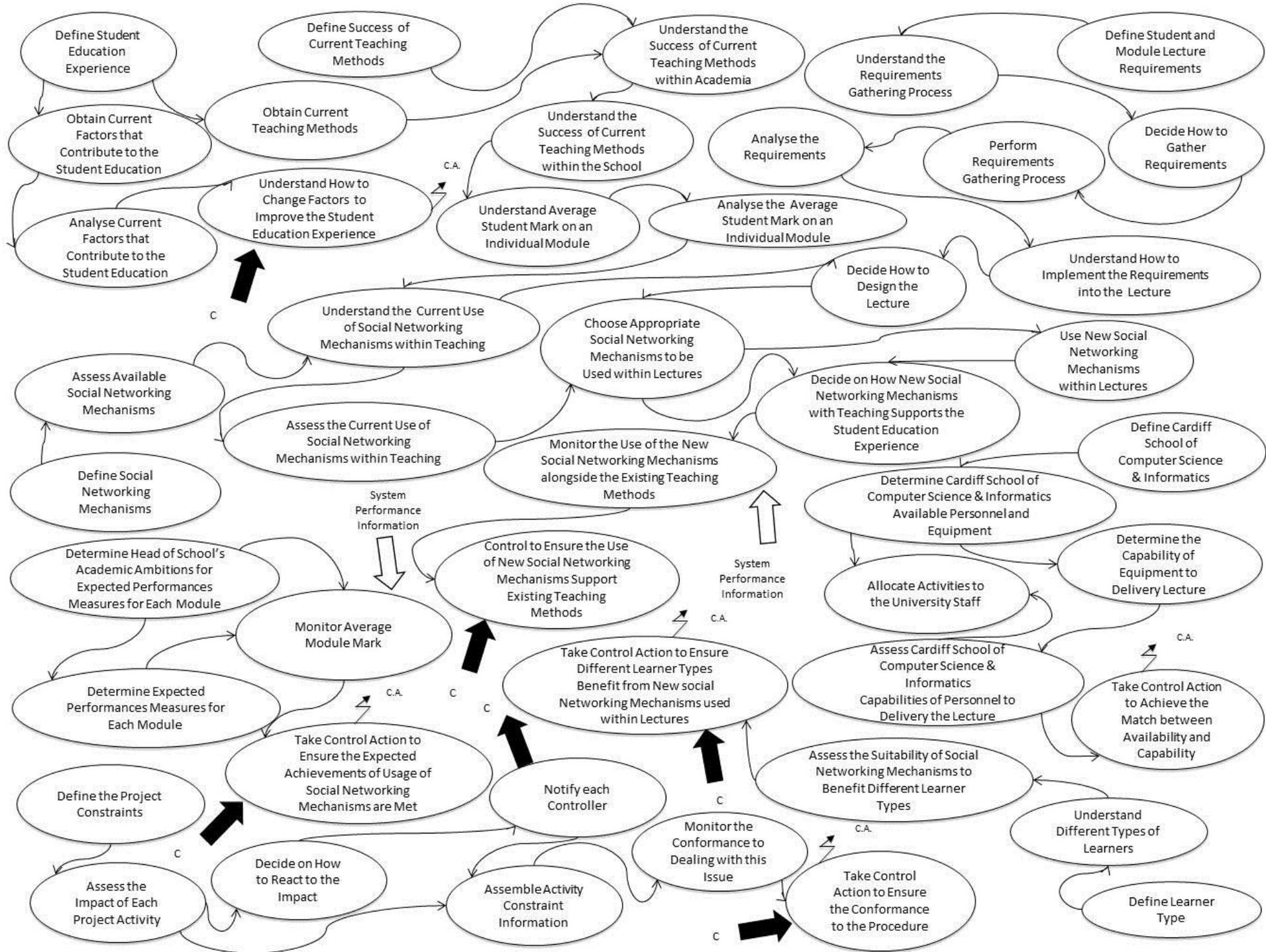
Figure 22: SSM Conceptual Model of Restructuring the Problem

7.0 Future Work: Future Considerations & Changes

The longevity of the project itself and stress with balancing other modules was a very difficult aspect of the project development but personally I believe it was dealt with very well. The initial stages were within my own control but as your project progressed, I became reliant on other people such as within the data gathering in the questionnaire stage of the project and then separately in the second semester, reliant on others to participate within focus group and questionnaires. For a research project of this type, involved participants are crucial to deriving any findings from the project, without the participants involved there would have been minimal research discovered.

There were three core areas of the project which if further research was conducted would need to addressed: focus groups participants, participant involvement with the teaching session and alternative mechanisms which could have been used within the session. In terms of the focus group participants, inviting lectures to the focus groups to allow them to gain a student understanding to why this type of teaching could potentially be used, similar to that of the student staff panel meetings, could have been used to great effect as it would have involved them with the earlier stages of gathering information and designing the session. Another aspect would have been to ensure the lecturers were made aware at an earlier stage within the project, this could have led to the session being delivered before Easter and having the analysis of report written up over the break. However, part of the innovative and unstructured teaching session being used was based on the surprise element to engage the participants but both sides of the argument could have been considered. A final aspect that could have be altered is that of using different teaching mechanisms within the session. There was potential to use other methods within the session rather than just Facebook and Twitter but that was not examined during the first semester data gathering process. Furthermore, there could have potentially opened up a Google group for Gmail users with the option to participate in an online forum similar to a Facebook discussion group which could have been another alternative to account for all types of online users within the session. A further alternative method considered was potentially having a phone with a blank sim card that allowed students to send anonymous texts to that particular phone which could have been held by the lecturer. This would have worked in a similar basis to using anonymous accounts that were restricted on Facebook and may have encouraged more interactivity within the session. In addition, particular the use of video recording the session or tape recording the session could have been applied. This would have allowed all the content to be written up in the form of a transcript, similar to what was used for the write up of the focus groups. A final aspect that could have been or edited for future project is that of the application of using Twitter as method of providing feedback for the questionnaire. This would have allowed the tweets to be run through an online sentiment analysis package used to directly scraped tweets and provide sentiment analysis rather than having to individually running the analysis on each individual comment provided through Survey Monkey.

8.0 Project Conclusions: Proving or Disproving the Hypothesis

The main ambition of the project was to thoroughly research and investigate the topic area which surrounded the usage of social networking sites within the student education experience and if these mechanisms actually enhance the student education experience. Based on the investigation stages and accompanying methodologies, the answer to this topic area has been clearly addressed**. Yes, the use of social networking sites do enhance the student education experience** but based on the data collected and analysed, **it is very much dependent on the most appropriate personnel, suitable social networking mechanisms and content being delivered to be correct for the scenario**.

The following methodologies have been used to research the problem and devise a proposed blueprint to tackle the problem in the future. Each of these individual methodologies were crucial for delivering the project to the detailed standard which has been investigated:

- Systems Dynamics e.g. Influence Diagram
- Focus Groups
- Questionnaire Data Analysis
- Sentiment Analysis
- Soft Systems Methodology e.g. CATWOE and a Conceptual Model

The process of **convincing individuals** within the school to appreciate this type of teaching tool is the next step in deploying this method within multiple modules. It is clear that based on the data collected from the students, **multiple modules** could make use of these type of teaching to enhance the student education experience. The problem that still needs to be addressed further is whether this type of teaching is **content specific**, from my experiences I would suggest that it is not content specific due to both theory and practical based modules can make use of this type of teaching within the lecture. A critical aspect as mentioned is ensuring the most **appropriate personnel** is provided for the session and that person can create **engagement** with the students within the lecture. If the person being used for the videoconferencing appears **passionate about the content** being discussed, it would open up the ability to **communicate with the students** and ensure **engagement within the lecture**. Potentially the project could have been trialed before implementation. However, the project was relatively based on an experimental basis and trialing it may have removed some of the **uniqueness, openness and unstructured discussion points** of the session. Alternatively, this could have **encouraged more interactivity** with the Facebook group and Twitter posts which would have **improved the engagement** within the lecture.

In terms of assessing the success of the project, it is appropriate to relate back to the initial aims as set within the project plan at the beginning of the project itself. The following statements relate to the aims which were stated for the final report, other aims were included within the project plan but these were used for the interim report as well:

- Aim Two – Systems dynamics modelling to discover the interlinking factors that contribute to the student education experience.

- Aim Three – To design a new unique teaching session involving one or two lecturers that advocate using social networking sites; assisting to discover the extent that these sites are beneficial learning aids.

- Aim Four – To analyse the unique teaching session and decide whether this provisional session is beneficial to the student education experience.

- Aim Five – To turn social networking sites into a more predominant teaching tool.

- Aim Seven – Review of all the work conducted since the completion of the interim report, including the unique teaching session and advanced changes to the influence diagram.

The first aim set for the final report, aim two, this area was very much tackled and precisely delivered. The influence diagram provided at the beginning of the project documentation clearly highlights all the elements that affect the student education experience. The diagram is based on my own personal experiences throughout my academic time at Cardiff University but also other aspects which have affected colleagues or are known elements used within the student education experience both internally and externally from the academic environment. This area was important for this part of the project as it set the scene for particular factors that needed to be investigated and provided thoughts for questions within the focus groups and potentially how the teaching session could be structured around certain mechanisms.

The second aim of the final report, aim three, was an aspect that was fundamental research segment for this project. Without the application of the interactive teaching session, the research would have been flawed as this was such an important aspect for discovering how social networking sites enhance the student education experience. The ability to perform an experiment using students new to the school was a great way of interpreting how the students thought how beneficial this method was to their understanding the content being taught within the module.

The third aim of the final report, aim four, was an area surrounding the analysis of the interactive teaching session. The initial intention was to perform note taking and data analysis from the questionnaire was applied but extending on this, the application of sentiment analysis was applied and the reflection on the data collected was portrayed in the form of the an SSM conceptual. The initial intention for this aim was a basic requirement that any standard experimental study would include, however the extension of using sentiment analysis provides a more insightful look on the classes of the comments to understand the positive and negative features applied. Lastly, the usage of SSM encapsulates a reversal of how the method is normally applied. For this instance, the application of SSM has been used to examine the ill-defined problem based on the data collected from all the other methodologies used throughout the project. The conceptual model essentially provides the blueprint of stages that would need to be considered if the session was going to implemented again e.g. within another module, different year group or consideration to install it within the syllabus of each module.

The fourth aim of the final report, aim five, is probably the one aim that can not be purely answered within this project documentation. The thorough research conducted and implemented session has provided the foundation to deliver this type of teaching within the school but the ability to make the session a more predominant teaching tool is dependent on the module leaders interest, available personnel and equipment which have all been discussed throughout the project documentation but in particular the SSM model. The application for of this type of teaching is already being trialed to some extent within the school as one of the second year modules, CM2205 Systems & Software Management,

applied videoconferencing as a means of delivering a lecture as the guest lecture was unable to attend the session. This is only a starting block but not entirely relevant to the application of my proposed teaching session as it was used as substitute for his instance and not as a fundamental aspect of the content being delivered.

The final aim of the final report, aim six, surrounds the conclusion to the project and proving or disproving the hypothesis. This aspect as been concluded throughout the project documentation within summary sections after each of the project stages but also during the initial stages of this conclusion to the project area. Thus, the ability to encapsulate all the findings of the project is crucial to solving student education experience problem being investigated.

In conclusion, the application of social networking sites within the academic environment does enhance the student education experience. However, the application of the method is dependent on the personnel involved, the appropriate mechanisms being applied and interest and appreciation of the technique by the participants involved making the session as beneficial as possible for the student's learning experience.

9.0 Reflections on Learning: Overview

The process of development of any form of project over a considerable timeframe is always a difficult task. It surrounds using good project management tools to ensure individual deliverable dates a strictly met but also the ability to have strong change management if a particular deliverable looks to be out of reach based on initial predictions. In addition, throughout this project development the initial weekly plans have differed based on other workloads from different modules in terms of coursework and revision for exams. Lastly, the development of this particular project combined various conceptual system building methodologies, data gathering and analysis methods learnt within various modules across the three years of study. Thus, the main area that was developed was that of student to lecture relationships to have a greater appreciation of the hurdles that need to be overcome when designing module syllabuses or individual lecture plans. The ability to determine the success of this project was based on the ability to prove or disprove the hypothesis and provide alternatives considerations of how the lectures can be deployed to gain greater engagement and interaction from students.

9.1 Reflections on Learning: What Aspects of the Project Worked Well?

Throughout the development of the project across both semesters there were various elements of the project that worked particularly well. One aspect was that of the data gathering process, it was initially difficult to gain the participants in the first semester large research questionnaire but the data retrieved was very interesting as it displayed that the students were interested in this type of teaching being proposed if it was within the most suited module and delivered value to their education. Moreover, this specific part of the development for the project was crucial to other aspects being deployed, without the backing and interest from the students who took part in the questionnaire, the teaching session would probably not have taken place and the research would have been minimalistic. In addition, another aspect that worked particularly well was that of once the suited module was discovered after much investigation, the interested participants involved were genuinely interested in this type of teaching being experimented. Both were younger lecturers/research students within the school and had a better appreciation of how this method could be used to great affect during the session. Their academic interests was aimed towards social computing and social networks; they were interested in seeing how this method would work and embraced the idea as it was an aspect that had not been trialed within the school. A final part of the project that worked well was that of having great backing from a supervisor who was interested in this subject area from his academic background. Also, he was very interested in what the outcome would actually be from the lecture and if it was only suited to specific modules, guest lectures or could it be used within multiple ones. Thus, there were many successful aspects of the project itself which was very rewarding over the long period of time that the project was in development and towards completion.

In terms of the delivery of the teaching session this was an aspect that worked well to some extent. In particular the use of videoconferencing using Google hangout, this provided the opportunity for an external individual to lecture during the session but also provide an option for a question & answer session. This aspect was particularly pleasing as the participant involved was of the younger generation and it was easier to put some of the content across to the students more easily as it was in touch with the current topics being discussed. Thus, the ability to have an external participant was particularly pleasing as it provided an industry perspective to the students for the content being discussed and

reiterated some of the points but across by the research students with an industry clarification.

A final successful part of the project was the application of the SSM at the end of the data analysis, this provided a conceptual problem solving methodology to understand the aspects of the delivery of lectures that need to be considered and how the application of social networking mechanisms can be applied, if this type of teaching was to be displayed within some part of the module. The process outlines what the ambition of the system should actually be and how the process will actually occur, it also accounts for the different stakeholders within the project and the performance measures that need to be met when constructing and producing the project. Thus, this was a successful part of the project as the application of the methodology is a great tool for understand how the lecture could be replicated, if the decision to use the process again was going to be used.

9.2 Reflections on Learning: What Aspects of Project were Difficult?

Alongside the successful elements of the project, there were many elements of the project that proved difficult and caused some deliverable dates to run longer than they should. One initially difficult element of the project was that of gaining participants for the questionnaire within the first semester and then focus group within the second semester. Emails were constantly sent from the school of office, alongside reminders within the COMSC 2012/13 Facebook group which contains first, second and third year students within the school, however finding participants was very difficult. As previously mentioned, this was crucial to the development of the project itself as the foundations for further research and project deployment was based on the findings from the questionnaire. Moreover, the only option was to constantly ask for assistance for the development until the students were willing to do so and this was incentivised by the use of treats for those who were willing to participant.

Another aspect of the project that was difficult was that of discovering the most suitable module for the teaching session to take place and the delivery data of the teaching session. The initial plans were to deliver the teaching session by the end of week 6 but due to difficulties finding participants for the focus groups, finding a suitable lecture slot to deliver the session and balancing other coursework, it was pushed back to the start of week 8 which later moved to after Easter on the first day back. In addition, finding the right timings for the teaching session was heavily based around the content being taught within the module at the time and whether the my proposal mechanisms could work alongside the content being taught at the time of the proposed delivery. Furthermore, it was very difficult to find the particular module to be suited for the session itself. Throughout the discussions with different lecturers, my own views and my supervisor, it moved away from using Developing Quality Software and towards using the Fundamentals of Computing with Java. This was due to the content being taught within the module at the time; Developing Quality Software was aimed towards team roles and group motivation, which are very general topics which was difficult to find a suitable individual to use within the Skype session. However, moving towards using Fundamentals of Computing with Java, allowed both a guest lecturer (research student) to lecture alongside the use of an external individual working for Box UK and proposing questions to both individuals related to their work, project experiences, potential job opportunities and core skills needed to excel within a position.

A further part of the project that was difficult was that of initially convincing lecturers to allow this type of teaching session to be trialed and deciding on the format of the delivery. Furthermore, it was very difficult to initially convincing lecturers to use this as an experimental method due to various reasons such as disruption to the current teaching plan,

personally not embracing the idea of using it as a teaching method and confusion on how it would be suitable for the content being taught. This was the main reason for them move from one module to another. As previously mentioned, the majority of votes for the module to use the application of the session was indeed Developing Quality Software but as a non-joint module of degree scheme, Fundamentals of Computing with Java was the majority module to be used. Moreover, due to generation gaps and types of preferences of teaching this idea was hard to put across for the first module which is partly the reason why it was moved to a different one. In addition, the format of the session was another aspect that caused confusion. There were changes from using it as a supplement for discussion elements within the lecture being used on a separate projector screen to developing it within a guest lecture and using the method as a tool within a Q&A session but also still using for comments and queries about coursework or exam material. This was an area, which the first set of lecturers were not too comfortable using, however the other two within a different module thoroughly embraced the idea.

A final part of the project that was difficult was that of using anonymous profiles within the teaching session. There was much research performed into using anonymous profiles for both Facebook and Twitter but there were differing viewpoints from the separate social networking sites. Furthermore, Facebook strongly refutes the idea and does not allow anonymous profiles, doing its best to police the site and remove profiles that appear to have a fake identity. Alternatively, Twitter appears to not be too concerned about who the user actually is on the site. A Twitter profile contains much less personal information about a user or even none compared to Facebook which includes academic and working history. It is hard to tell if using anonymous profiles would have proved more beneficial for the session or not due to levels of interactivity and engagement within the session. In addition, the main reason for moving away from using them was not only the ethical concept but also the fact of it being time consuming to set up individual accounts for all students enrolled on the module as each account needs it's on individual email address for validation.

9.3 Reflections on Learning: Management Strategies Applied

Throughout the project development there were multiple project management strategies applied to ensure the delivery dates could be met as well as possible. From the outset of the project, the initial project plan was followed closely throughout the development of the project apart from the final stages which had a slight reshuffle due to waiting for confirmation of participates, structure the teaching session and even other coursework assignments. Furthermore, throughout the development of the project, fortnightly meetings occurred with my supervisor, to keep him informed with working was been produced and the next goals of the project itself. If any issues occurred, emails would be sent between myself and my supervisor to sort any urgent problems and provide solution to deal with what needed to be sorted. In terms of data retrieval within the questionnaire handout process, constant requests were sent first years to complete questionnaires through the COMSC administration staff in the reception and myself to ensure a retrieved a satisfactory amount of data for the questionnaire to be deemed to have a high response rate. Lastly, possibly the most crucial part of the project for applying management strategies was that of arranging the teaching session and ensuring proceedings went efficiently and effectively to derive the data required for my analysis of the teaching method. During the construction process, there were constant emails and meetings between myself and the module leaders or lecturers to ensure they are fully aware of what was happening within the session. When the confirmed module was decided upon, a final meeting was arranged between all parties involved within the session including Mr M Williams in person with Dr M Chorley on Skype which was used to confirm all the plans for the session itself.

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11.0 Appendices

See attached Appendices containing the following documents:

- Appendix One: Influence Diagram Variable Explanations
- Appendix Two: Focus Group Structure
- Appendix Three: Consent Participation Form
- Appendix Four: Interactive Teaching Session
- Appendix Five: Focus Group Facebook Post
- Appendix Six: Focus Group Email
- Appendix Seven: Email to the School's Marketing and Communications Officer
- Appendix Eight: Focus Group Comments Analysis
- Appendix Nine: Trial Focus Group Transcript
- Appendix Ten: Final Focus Group Transcript
- Appendix Eleven: Post-Teaching Session Feedback Questionnaire
- Appendix Twelve: Teaching Session Declaration
- Appendix Thirteen: Facebook Posts and Twitter Tweets
- Appendix Fourteen: Sentiment Analysis of Qualitative Questions

12.0 Glossary

A

- Auditory Learner – A learner who prefers to have ideas explained verbally or revising my speaking topics aloud and constantly repeating the process.

B

- Bipolar Questions – Based on a seven point scale containing a wide range of answers from a two ended scale with a middle point. e.g. Much too long to About right to Much too short.
- Box UK – Agile software consultants and developers. Provide precise design and delivery of high-performance software products and services for enterprises worldwide.

C

- SNT 2013 –Social Networking Teaching based on using the Facebook group called "SNT2013" allowing relevant content to be posted by members of the group. In addition, the Twitter hash tag "#SNT2013" used for posting relevant content and aggregating all the data with the relevant tag applied.

D

- Deep Approach – Applying a heavy theoretical understanding to complete an intend tasks, going beyond the required amount of effort to understand the concept due an interest in the domain or wanting to achieve a great rewards from the task.

E

- Eduroam – A service (or JANET Roaming Service) that allows users visiting participating institutions to access network resources using the logon credentials setup and confirmed by their institution. Used a part of providing wireless transaction of data across the Cardiff University network.

F

- Focus Group – A qualitative research method designed to understand perceptions, opinions and view points towards a particular item or product. The segment size is typically a small amount with normally no more than 8 to 10 people undertaking the session.
- Favourited (Twitter) - A small star icon next to a Tweet, normally used when users like a Tweet. Lets the original person who sent the tweet, know that another user likes their tweet. Works in a sense to liking a post on Facebook.

G

H

- High-Level Engagement – The process of theorising, applying and relating to understand concepts being taught and using a strong application of knowledge to fully understand all aspects.

I

- Influence Diagram – A conceptual model that displays individual variables that relate to a main concept, it includes interrelationships to show inverse and adverse effects on particular variables. Associated with the concept of system dynamics.

J

K

- Kinesthetic Learner – A learner who is engages with problem solving using a hands on approach through practical sessions.

L

- Low-Level Engagement – The process of using describing, note taking and memorising on a small scale to adequately understand topics but not applying great detail to fully understand the ideas being taught.

M

- Multi-Modal Learner – A learner who combines multiple learning concepts and types.
- MOOCs - An online course provided by a specific institution aimed at large scale participation of a community of online users with open access across the web.

N

O

P

Q

R

- Read-Write Learner – A learner who prefers information to be displayed in writing, such as drafting and note taking. Takes notes and learns from repetition of note taking.
- Retweet (Twitter) – Used a mechanism of sharing a particular poster's tweet, if the account is public, allows the tweet to be displayed to the retweeter's followers.

S

- Surface Approach – Applying a minimal amount of effort to the task required to achieve a basic pass for completing a task.
- Sentiment Analysis – Based on processing the natural language to identity subjective information resources within the item in use. Associated with text analytics and data mining.
- Soft Systems Methodology – A systemic approach used for defining real-world problems, resolved unclear problems that lack a formal definition.

T

- Tag Cloud – A visualisation method of metadata associated with the importance or frequency of each word being displayed in a larger font size.
- Teaching Session – A learning sessions that can be in the form of lectures, tutorials or laboratory classes. For this instance, based on a lecture format.

U

- Unipolar Questions - Based on a five point scale containing a spectrum of answers e.g. Extremely helpful to Not at all helpful

V

- Visual Learner – A learner who uses words and phrases to visualise ideas being taught.

W

X

Y

Z