

# 2nd Year Group Project Management Tool

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## Interim Report

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## **Abstract**

Each year the department of computer science assigns 2<sup>nd</sup> year students a group project which gives students an understanding of a professional approach to system development. Groups are required to deal with the challenges of teamwork, planning and completing the project within a set time scale based on identifying and meeting defined requirements. One of the key problems all students will face is the challenges group collaboration, in particular communicating and producing work across a distributed team. This can be more challenging than for example a group of developers working in an office environment, as students will have other commitments, different timetables of study and other university assignments.

This project attempts to identify the problems encountered and propose a system to help students manage their 2<sup>nd</sup> year project.

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## **1. Introduction**

### **1.1 Scope**

This project is to propose a 2nd Year Group Project Management Tool. The project is concerned with project management and the collaboration the project groups, specifically for the 2<sup>nd</sup> year Cardiff University School of Computer Science & Informatics. Team roles, work breakdown and group dynamics, is beyond the project scope. This project is to provide a system to assist students in managing their project and associates issues.

### **1.2 Project Aim**

This project is aimed to tackle typical problems encountered during the 2<sup>nd</sup> group project. The project will identify if there is need for such a system, what problems people encountered in such a project, what tools and resources are already available both commercially and within the school. The project will also provide a bespoke system for this purpose. The system will include a calendar with an event facility for the project deliverables, a document sharing system with change control and project management features and a forum/chat facility with possible integration to other services.

### **1.3 Project Objectives**

- To find out why such a system would be required and what advantages it can bring to its future users.
- To discover what existing systems or tools are available, what functions they have and analyse if they are suitable for this project.
  - To conduct a breakdown analysis of the most popular tool, Microsoft Project.
  - To establish project management procedures (such as PRINCE2) in general and specifically the elements useful to this project.
  - To find out the normal project management practises for a group conducting such a project in university and commercially.
- To find out what the potential users would desire in the system by conducting primary research from students (3<sup>rd</sup> year & 2<sup>nd</sup> Year) and other staff members from the school.
- To incorporate project management features such as change control, version control and document sharing to assist the group project
- To gather a set of requirements from the research conducted, analyse and create a requirements specification
- Design & model the system using appropriate techniques
- To build a bespoke web based project management system.
- To test the system to ensure its usability, functionality and if it is fit for purpose

## **1.4 Approach**

The systems development lifecycle (SDLC) is a methodology framework for building systems. The main idea is

‘to pursue the development of information systems in a very deliberate, structured and methodical way, requiring each stage of the life cycle from inception of the idea to delivery of the final system, to be carried out rigidly and sequentially’ (Elliot 2004).

The SDLC underpins many software development methodologies. The development approach chosen follows the waterfall lifecycle to some extent; however I will be using an incremental build model which combines linear and iterative methodologies. This removes the rigid elements of the waterfall model phases and design, implementation and testing are carried out incrementally until the system is finished. The model also combines prototyping, the creation of prototypes until a final prototype which will be the working system is delivered.

## **1.5 Assumptions**

- CM2301/CM2304 Systems Design and Group Project module will retain the same or very similar structure in forthcoming years.
- Based on the nature of the department the majority of students will be experienced with the technical environment.
- Based on the nature of the department the majority of students will be experienced with web-based system environments.
- All students have access to Cardiff University computers and the vast majority will have a personal computer with an Internet connection.
- Scope of the project is limited statement in section 1.1 and scope creep procedures will be followed.

## **1.6 Beneficiaries**

This project is specially targeted for 2<sup>nd</sup> year computer science and business information systems students at the School of Computer Science & Informatics. Further to that the project is intended to be a system to help manage the difficulties faced in the compulsory Systems Design and Group Project module.

## **1.7 Summary of Outcomes**

- The scope of the project is limited to 2<sup>nd</sup> year Cardiff University School of Computer Science & Informatics projects.
- The aim of the project is to identify what is required of such a system, to discover what existing systems and tools are available and provide a bespoke solution to the problem.
- I will approach the project using the incremental build model to ensure that the final system is matched to the requirements.
- This project is based on assumptions defined in section 1.5.
- The aim is to develop a system that future students can use, not only to help them organise their project but to offer the opportunity to use a more formal and corporate approach to approaching identified problems.

## **2. Background**

Initial background research was conducted to explore the wider context of the project and fully define the scope of the project. The underlying purpose was to understand what elements of systems; in particular project management and group collaboration systems are relevant to the project and to identify the needs to additional functionality.

Research took the form of identification, review and summary sourced from books, Internet resources, and members of computer science staff and Cardiff university students from the school of computer science and other departments.

### **2.1 Identified problem situation**

Whilst participating in my group project in my second year I can relate to and identify many of the issues defined in this project. The feedback from my group project team members was explained there was general difficulties in communication and that there was a lack of efficiency in terms of working as a group to achieve deliverables, duplication of work occurred and that wrong versions of files were used. My group support the idea of a system to tackle these problems and think that it would be beneficial to new students

In a survey of current second year computer science and business information systems students I discovered in the sample of respondents that responded a range of existing solutions are being used to help assist the group project. Facebook feature 'Facebook Groups' is being used by almost everyone for communication for example arranging meetings and exchanging ideas. Dropbox is being used by a large majority of students for sharing files. Some other services such as email and SMS are also being used. No groups indicated they were using any group collaboration or project management solutions. In the survey, no one responded to using Lotus Quickr, when asked most respondents did not even know it existed or what it really offered. Despite this Lotus Quickr, a group collaboration package is clearly integrated into 'Cardiff Portal' under the 'collaboration' section.

To discover whether this was an issue of Computer Science & Informatics students not using the 'Cardiff Portal' service I conducted a brief survey across different year groups in other Cardiff University departments. In the seven other departments I studied, some students did not have a group project so results were irrelevant but those who did have a group project indicated that they did not use Cardiff Portal Collaboration services or Lotus Quickr to engage in group work.

See Appendix 1, for the results.



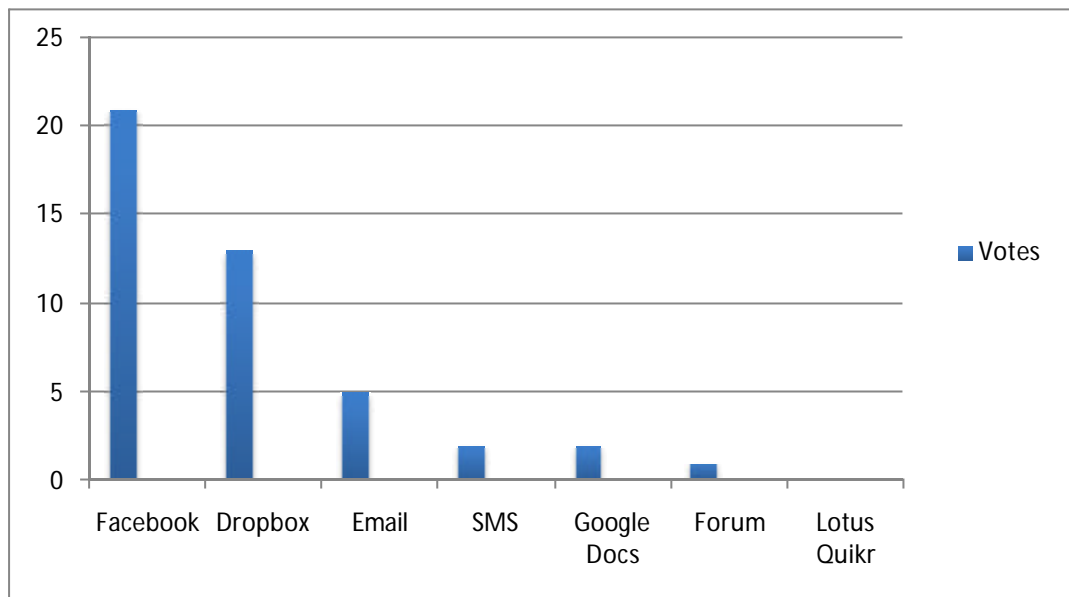


Figure 2.1 Sample of second year computer science and information systems students (See appendix 2 for detailed survey results)

### 2.3 Constraints on approach to be adopted

The proposed system must be designed, implemented and tested in a short time period (Dec-April 2012). I will be the designer and developer, constrained to limited resources and university regulations. If this project was to be completed on a larger scale some programming tasks for example might be allocated to freelancers and developers may have access to a wider range of software.

There are a wide range of software and web-based tools capable of managing projects and organising people, therefore it might seem straightforward to pick one to use for the 2<sup>nd</sup> year project. However, although many of the systems provide useful services and complicated functionality, none of them quite meet the requirements for this project. There a number of unique issues associated with a systems development project in an academic environment, which must be taken into account for example distributed working, in non-consistent working hours. I intend to develop a system that is bespoke to the 2<sup>nd</sup> year project by exploiting the capabilities of several systems that I have researched. I will expand on these systems in section 2.4.

### 2.4 Existing solutions relevant to the problem area

Microsoft Project is a project management software program. It is well established and has gained the dominant place in project management market; however it is not part of any Microsoft office suites. It must be installed locally and supports some very complicated features. It is mainly used to assist project managers develop plans, assign resources (e.g. staff) to tasks, and manage budgets,

management of workloads and tracking project progress. Microsoft project is useful at an enterprise level, however many of the features seem unnecessary for the purposes of this project for example budget control and the ability to interlink multiple projects. The application is required to be installed locally, which causes problems for the distributed team that can only be overcome by integrating for example Microsoft SharePoint Foundation. Some features of project would be useful for the purposed system for example deliverables management, team roles and schedules, reporting features, risk management and being able to constrain project progress until prerequisite tasks have been completed.

Facebook, the largest social networking service in the world is the preferred way of communicating on the web for many people). This is represented by huge amounts of active users (Miller 2011) and Facebook sometimes exceeding Google's traffic in the UK and USA (Dougherty 2010). The features we are interested in for the purposes of this project are Facebook Groups. This gives the ability for number of registered Facebook users to communicate and share information. Facebook Groups allows users to post updates and questions, photos and videos, instant message (IM) with group members, schedule group events and add documents (however this does not support attachments, just a basic rich text editor). Users can select a variety of privacy controls, can receive notifications (on Facebook and via email) of activity on the group and the group is provided with a group email address for communication off Facebook. Constraints are that users must sign up for a free Facebook account and although Facebook is related to group collaboration tools it offers no project management, group collaboration or content management features. However in a sample of 2<sup>nd</sup> year computer science and information system students Facebook was clearly the most popular system being used for communication (See Figure 2.1).

Dropbox is a cloud-based file hosting service. Whilst the primary function of Dropbox is a storage service it focuses on file synchronization and sharing. It allows users to share folders with selected users. The service may be installed locally on a variety of platforms and web-based service is also available. This helps address the content sharing issue of the project, and it offers some project management features such as version control; however this is limited to 30 days. In a sample of 2<sup>nd</sup> year computer science and information system students Dropbox was used by the most groups for file sharing (See Figure 2.1). However it differs from group collaboration system as although users can access files, and update with a different version, problems have been reported that if one or more users are simultaneously accessing a file one users work will be lost if the other users updates first, a conflicted copy will be created and changes not merged (Dropbox 2010). The proposed system will attempt to address this problem by users being able to 'check in' and 'check out' a file when they are working on it.

Lotus Quickr provides easy to use, useful team collaboration features, which can be particularly beneficial for distributed teams. It will help reduce inconsistencies and duplication of efforts. It does support some project management facilities such as setting milestones, due dates, assigning priorities and roles in the 'task' facility. But it does not support the full range of PM features a PRINCE2 project may require. Some change control and version management facilities are present. But it is not as formal as M/S project or IBM DOORS. It does not support requirement management facilities, UML modelling or advanced facilities a software project may require. Integrations allow Quickr use to be expanded for example Microsoft Office integration.

IBM Rational Doors is an enterprise level requirements management application attempting to improve quality by optimizing communication and collaboration and by promoting compliance and verification. IBM Rational DOORS provides a reliable, precise and advanced way of managing requirements across a distributed team. It supports the ability to link requirements to design items, test plans etc. and the system can scale to match changing requirements. It also supports some very useful Change Control Procedures and the ability to link changing requirements with design plans etc. It also provides support for UML, which would be beneficial to a COMPSI group project. However I think this system is designed for very large organisations with large, complex and distributed teams. It appears that you can only get the full advantage of this system if you run other IBM software such as IBM Rational ClearCase Change Management Solution.

Google also offer a variety of web-based services. Google Docs allows users to create documents online or add Microsoft Office documents. It provides functionality for users to be able to share documents with other Google account holders. It supports some basic group collaboration features such as real time online collaboration with and chat with other collaborators. It also offers a role-back history of documents, which is similar to version control. Gmail is Google's email service, which can be integrated with Gmail tasks and Google calendar, which can be used for group collaboration such as arranging meetings. Users can add guests to events in the calendar, and also provide their availability by marking times as busy/available. These Google services provide a clean GUI, with good use of icons, colours and drag and drop features to provide a user-friendly experience. However although it may be adequate for group communication and document sharing, it does not provide all the functionality required for the purposes of this project.

I intend to develop a system that is bespoke to the 2<sup>nd</sup> year project by exploiting the capabilities of the systems discussed in section 2.4. These systems were tested intensively and I discovered that none of them provided the exact functionality required for this project. Microsoft Project is too focused on being utilized for a project manager to manage projects and staff, the language is too technical and it is not web based. I intend to exploit the tasks, working times features and embedded it within the web system, in layman's terms. Facebook provides only basic functionality, which is not adequate for this project; however most students would already be using this system. So I intend to use Facebook's API to embedded Facebook Groups within the proposed system, this will allow the system to produce external notifications to Facebook. Dropbox provides an adequate way of sharing files with a group however there are issues with simultaneous working and conflicting files, it does not support a check in/check out file facility. I intended to exploit the Dropbox web interface for file sharing and embedded a similar function in my system. Lotus Quickr is the best existing solution, despite students not using it. However it mainly focuses on group collaboration and doesn't include some of the necessary project management features that M/S project or IBM Doors offers. I intend to exploit the check in/check out of files capability and integrate it with the file sharing function; also I intend to make a system very similar to the discussion facility on Quickr as it is fit for purpose. IBM Rational Doors offers a powerful requirements management solution, but it is too specific for large-scale enterprise level projects. I intend to take some of the ideas of Doors to ensure requirements are managed in an efficient and consistent manner. Google's variety of web services is adequate for personal sharing but do not offer enough collaboration features for the purposes of this project. However there user interface

and design is straightforward and easy to use. I intend to exploit this type of design whilst designing my system to ensure to efficient system usability.

	Microsoft Project	Facebook	Dropbox	Lotus Quickr	IBM Doors	Google Docs
Web based	Integration available	Y	Y	Y	Integration available	Y
Discussion	N	Y	Y	Y	N	Y
File sharing	N	Y	Y	Y	N	Y
Version Control	Y	N	Y	Y	N	Y
Ability to lock file	N	N	N	Y	N	N
Task Management	Y	N	N	Y	N	N
Resource management	Y	N	N	Y	Y	N
Requirements management	Y	N	N	N	Y	N
Use of Layman's language	N	Y	Y	Y	N	Y
Event /calendar facility	Y	Y	N	Y	N	Y
Aimed at	SME	Personal	Personal	SME	Large corporations	Personal
Cost	<£500	Free	Free (2GB)	£<1000	£3k-10k	Free
License	Proprietary	SaaS	Proprietary	Proprietary	Proprietary	SaaS

Figure 2.2 Comparison of existing systems

## 2.5 Research Questions

**Aim:** The aim of this project is to develop a web-based system to assist students plan and manage their 2<sup>nd</sup> year group project, in particular to focus on the project management and group collaboration aspects.

**Research question(s):** In order to achieve the state aim, this project will identify current systems students use to manage and collaborate with group members, determine what is required for the proposed system, identify existing solutions to the problem situation, determine how to approach system development whilst considering constraints and develop an web-based solution and demonstrate how it is beneficial for 2<sup>nd</sup> year students.

### 3. Specification and Design

The list of requirements has been reviewed and refined several times. Requirements of little importance have not been included, as this section is to expand on the core functionality and important aspects of the system. Based on the requirements in figure 3.1 a high-level use case diagram has been created. The latest requirements are as defined in section 3.1.

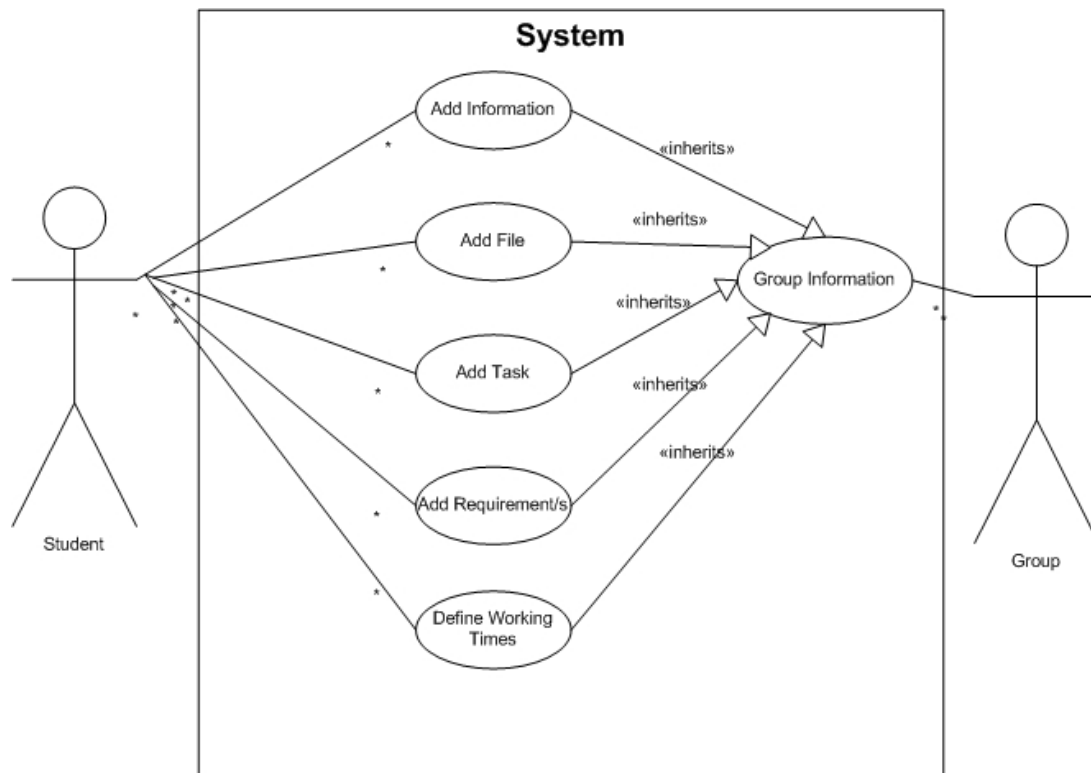


Figure 3.1 Use Case Diagram.

### 3.1 Requirements

#### 3.1.1 Functional Requirements

1. The system must provide a web-based system.
2. The system shall provide interaction, between group members that can be visible to the whole group.
  - The system shall allow exchange of information between members
3. The system shall facilitate the group to be kept up to date with relevant and real time information about the activities of the other members
  - The system shall provide group members with current information about group meetings.

- The system shall provide group members with current information in regards to minutes of meetings
  - The system could provide group members with current information when group deliverables are updated
4. The system must provide external notifications to changes of activity of group members
    - The system shall provide email notifications of changes to group discussion
    - The system shall provide Facebook notifications of changes to group discussion
    - The system could provide notifications of approaching deadlines of deliverables
    - The system could provide notifications of changes to file sharing
  5. The system shall provide a file sharing facility with version control and the ability to 'check in' and 'check out' a file from the system.
    - The system could allow group members to 'check out' a file when they are using it; it will then become locked preventing others from accessing it, preventing duplication of group efforts.
    - The system could provide a 'timeout' facility which will prevent a user from 'checking out' a file and forgetting to 'check it back in' which prevents access to other group members.
  6. The system shall provide the ability to create group tasks, allocate group members to tasks, and create milestones and deadlines for tasks.
  7. The system shall provide the ability to define and management requirements.
    - The system could provide ability to group members to review and accept/decline requirements before they are final
    - The system must cope with changing requirements
    - The system could provide the ability to link requirements with tasks and deliverables
    - The system shall provide one format that all the group will use for defining requirements
  8. The system will provide the function for users to define available working times around lectures etc.
    - The system shall natively exclude university vacation periods
    - The system could provide ability to add deadlines from coursework timetables.

### **3.1.2 Non-functional requirements**

- The system shall implement a simple user interface
  - The system must use a familiar web-based style GUI
  - The system should make use of icons
  - The system must not be too cluttered with unnecessary functionality
  - The system should make use of layman's terms instead of technical language
  - The system should implement clear and concise error messages
  - The system could adhere to ISO 9241 standard, covering ergonomics and human computer interaction.
- The system must provide a consistent interface
  - The system must use a consistent design and layout

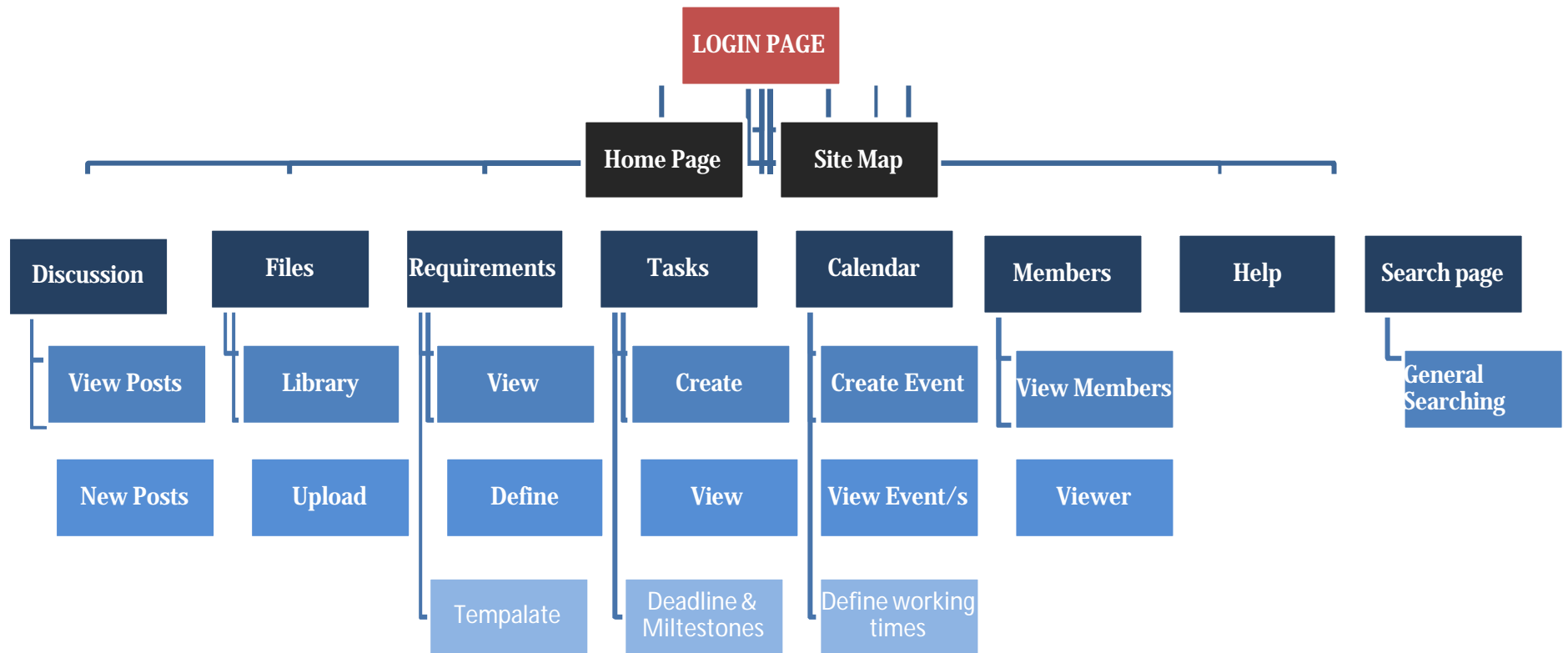
- The system should make users select from a list of pre-selected typefaces and fonts for all activities
  - The system will provide templates for weekly reports
- The system must be reliable
  - The system must work on Microsoft Windows 7/Vista/XP
  - The system must work on Mac OS X 10.6/10.5
  - The system must support Microsoft Office 2010/2007/2003
  - The system must support Microsoft Office for Mac 2008/2011
  - The system could support OpenOffice 3.3.0 for Linux
  - The system could support iOS 4/5 and Android 4
  - The system must handle PDF, secure PDF, JPEG, PNG, RAW, GIF, BMP, PSD, MP3,
- The system must be accessible
  - The system must make use of a suitable colours and font use to ensure people with visual impairments have the same experience.
  - The system could follow Cardiff University's web accessibility principles.
- The system must be recoverable
  - The system must backup group and user data locally
  - The system should provide restored functionality with 24hours of failure.

## **3.2 Approach**

From the research conducted and the derived requirements, I produced a sitemap in section 3.3.1, to show how a user will navigate the website, and the pages the website will need. I also produced some mock-up GUIs shown in section 3.3.2.

## **3.3 Design**

### 3.3.1 Sitemap

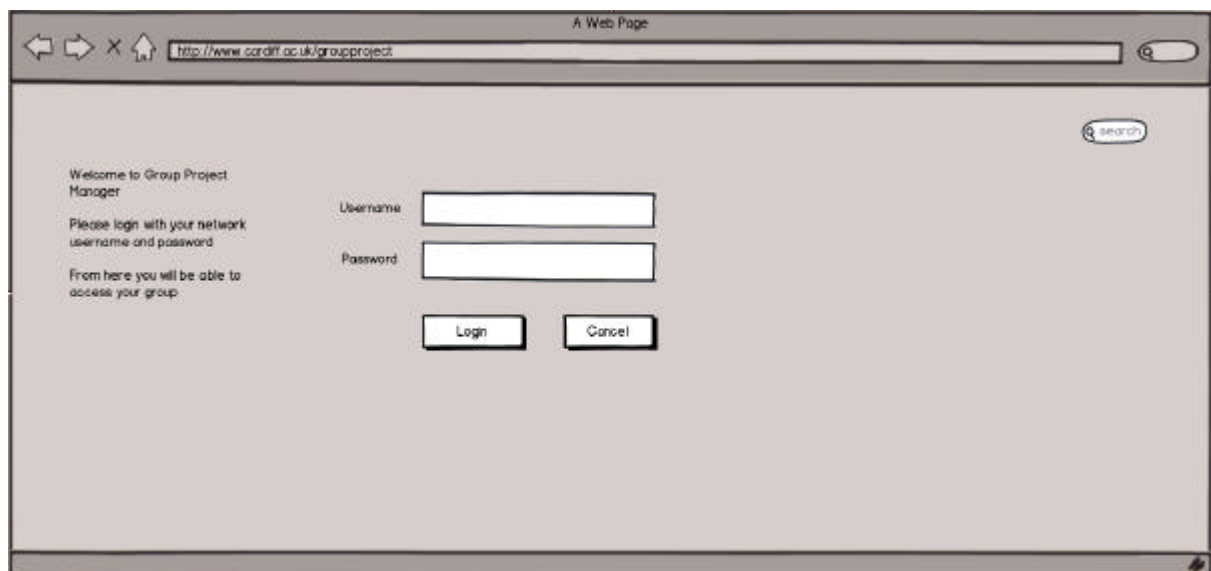




### 3.3.2 User Interface Prototypes

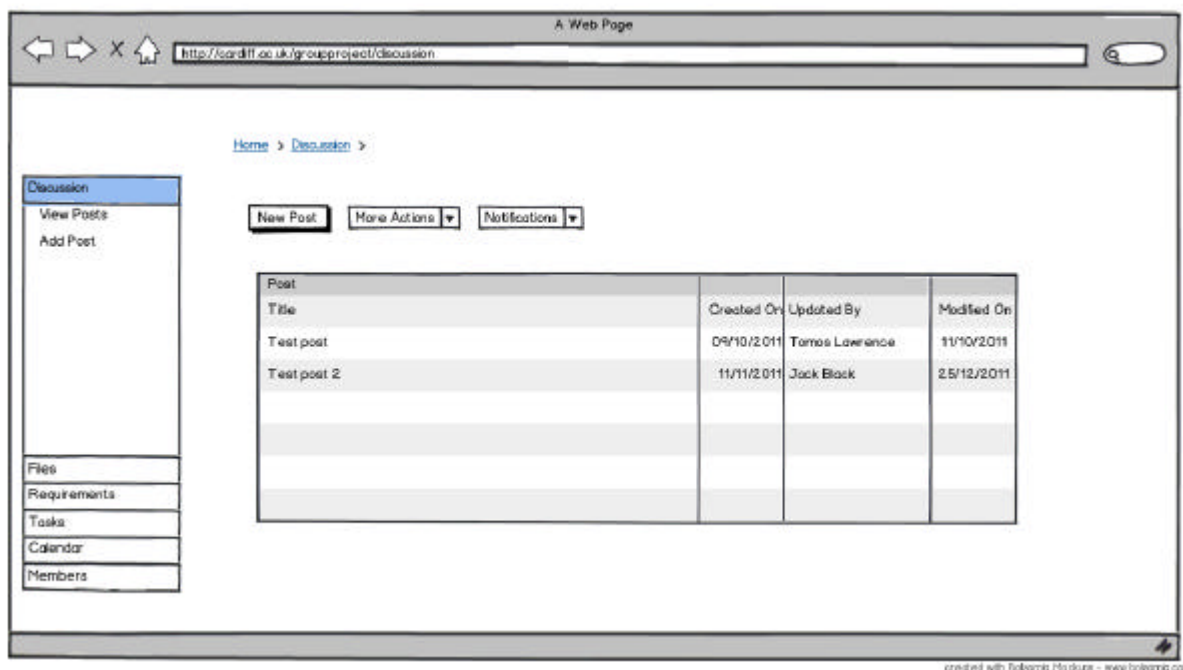
I have designed some rough screenshots of how the Graphical User Interface (GUIs) would look on the system.

*Login Screen:* The user would be presented with a simple login screen, in which they would be required to enter their university username and password, once authenticated they would be brought to the home screen



The screenshot shows a web browser window with the title 'A Web Page'. The address bar contains the URL 'http://www.cordiff.ac.uk/groupproject'. The main content area has a light gray background. On the left, there is a welcome message: 'Welcome to Group Project Manager', 'Please login with your network username and password', and 'From here you will be able to access your group'. To the right of this text are two input fields labeled 'Username' and 'Password'. Below these fields are two buttons: 'Login' and 'Cancel'. In the top right corner of the content area, there is a search bar with the word 'SEARCH' inside it.

*Discussion Screen:* The user would be presented with an overview discussion page, with breadcrumbs on top, to indicate current location. They are also presented with a simple 'sidebar' providing access to all other features of the website. The user has an overview of recent posts in this page, with version control features allowing the user to see when a file has been modified and by whom. The user also has the option to configure email/Facebook notifications.



*Discussion Screen (On iOS device).* This is how the discussion page could be presented on iOS devices. It aims to provide the same functionality as the web page but content is not as flat as the webpage requiring users to browse through more menus to access data, due to the nature of the operating system.



## **4. Conclusions**

### **Summary of Results**

- After doing background research I concluded that a bespoke project management and group collaboration system would be the best solution to the problem situation, instead of using a potential existing solution that would not be entirely fit for purpose.
- Based on the research a requirements specification was composed which describes to the user what the system is required to do.
- Preliminary designs were produced to show the structure of the system and to how users would interact with the system.

### **Aims of interim report**

- To define the scope of the project, and project aims and objectives.
- To provide a background of the topic, in particular existing systems and tools.
- To give the user an understanding of the problem situation.
- To derive an aim and research questions.
- To produce a requirements specification.
- To give an insight into the approach of design, the structure of the system and to propose the interface of the system.

### **Future Work**

Due to the nature of this semester personally my modules are a 70/30 split. Therefore in my initial plan I scheduled the majority of the project to be carried out next semester. Next semester I intend to design the system in detail, build the web based system and test it. The final report will include the final design, with extensive use of diagrams to expand on the different viewpoints of the system and final GUI. I will also include the implementation section how I developed the system, problems encountered and solutions if applicable. The final report will include a section based on testing, I will then discover if the system that has been implemented meets the requirements and students needs.

An updated time plan can be found in Appendix 3.

## Appendices

### Appendix 1 – Lotus Quickr Survey

Cardiff Portal – Collaboration – Lotus Quickr Survey

**Question:** For my final year project I am conducting a survey in regards to group work/group projects. Have you used Cardiff Portals Collaboration services, in particular Lotus Quickr to work as a group, if not please indicate what you use.

\*Aim to find someone across Y1, Y2, and Y3 on the majority of courses and if possible conduct a further survey with some of their fellow students\*

#### Results

Usage by course group:

*BIOSI*: 3rd year students, response use only Cardiff Portal, never used Lotus Quickr, but have been advised to used collaboration tools for project within Cardiff Portal, but think it is easier to use Facebook and Google Docs.

*CARBS*: 3rd year student, use Cardiff Portal for email and learning central, have used discussion facility within Blackboard but not Lotus Quickr for group work.

*CLAWS*: 2nd year student, used for learning central and email, no group project.

*EUROS* : 1st year student – no group project yet, used Facebook for group presentation and Cardiff Portal for email and learning central

*HISAR* : No group project, group's presentations usually meet in person to plan.

*PHRMY*: 2<sup>nd</sup> year student, use learning central and Cardiff portal for emails. For group project/poster used Facebook to communicate and email to share files.

*SOCSI*: 2nd year student, No real group project. Have used discussion facility within Blackboard.

### Appendix 2 – Current 2<sup>nd</sup> years survey

#### Sample of second year computer science and information systems students

Second Years: What tools are you using, if any to communicate and share files for the group project?

## Survey Respondents

Facebook	Dropbox	Email	SMS	Google Docs	Forum
Matthew Nunes	Matthew Nunes	David Evans	Louise Knight	Louise Knight	Jake Middleton
Pantelis Mikellides	Pantelis Mikellides	Louise Knight	Sam Kimish	Sam Kimish	
Tom Hartley	Dan Cansdale	Pantelis Mikellides			
Louise Knight	Michael Crosscombe	Shyamil Shomes Tanna			
Dan Cansdale	Oliver Jarrett	Michael Crosscombe			
Sam Kimish	Adam Boulton				
Steffan Rhys Walters	David Evans				
Dolly Thomas	Tom Hartley				
Michael Crosscombe	Brett Stevens				
Shyamil Shomes Tanna	Owen Roberts				
Sam Boyes	Alex Jones				
Oliver Jarrett	Adam Raine				
David Evans	Sam Chess				
Brett Stevens	Jessica Cholerton				
Owen Roberts	Charlotte Lippiett				
Joe Starling					
Alex Jones					
Adam Raine					
Sam Chess					
Jessica Cholerton					
Charlotte Lippiett					

### Notes:

General response is that Facebook is being used by almost everyone for basic communication. Everyone

Most people are using Dropbox to share group files. This requires the application to be installed on a computer. This isn't that versatile as although you can access files via Dropbox website, the Dropbox application must be installed first, which cannot be done on

campus. Although Dropbox allows users to share folders, it does not support any real version control, which can lead to, two group members simultaneously working on the same file, and the related problems. However it does allow users to share any files, with up to 2GB free storage.

Some people are using email, alongside with Facebook to share files.

SMS is being used by one group to remind people of meetings, deadlines and work required.

Another group is going a Forum for communication, each group member must create a new account and there seems to be no extra functionality than Facebook.

In the survey sample, no one said they were using Lotus Quickr through Cardiff Portal. No one even knew it existed or what it really offered.

All survey respondents indicated that a system to integrating all these features for group collaboration would be useful.

### **Appendix 3 – Time plan**

Week 11 – 12/12/2011: *Interim Report Deadline – 16/12/2011*

#### *Christmas vacation & Examinations, 17/12/2011 – 27/01/2012*

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16/12/2011 -22/12/2011	Design & start to build models
Week 1 – 30/01/2012	Refine design & start to build models
Week 2 – 06/02/2012	Finalise design
Week 3 – 13/02/2012	Start to build system
Week 4 – 20/02/2012	Implementing system
Week 5 – 27/02/2012	Implementing system
Week 6 – 05/03/2012	implementing system
Week 7 – 12/03/2012	Implementing system & testing system
Week 8 – 19/03/2012	Testing system
Week 9 – 26/03/2012	Final Report Writing
Week 10 – 02/04/2012	Final Report Writing
Week 11 – 09/04/2012	Final Report Writing
Week 12 – 16/04/2012	Final Report Writing
Exam Period	Finalising Final Report

*Final Report Deadline – 04/05/2012*

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