1 Introduction

1.1 Document scope

This document illustrates the rationale behind the design decisions taken during the development of the replacement spreadsheet, prototype website and proposed integrated intranet and database system. It documents and justifies each decision taken during the process by referring to literature.

1.2 Document structure

Section 2 describes the features and characteristics of the replacement spreadsheet system. Section 3 explains the principles behind the static website prototype. Section 4 presents the case for implementing the recommended integrated intranet and database system.

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2 Spreadsheet

2.1 Summary of design

Since a spreadsheet is neither the most user-friendly nor the most powerful way of replacing the existing system, any changes which alienate the system's existing users are not tolerable; the primary benefit of replacing the current system with another spreadsheet is the agreeable lack of need to retrain the system's existing users [Alder, 2007].

The overall approach taken has very much been one of utilitarian design. Considering that some of the departmental timetablers have been carrying out the same task for upwards of ten years, the design decisions taken during this process centre around making their lives easier by improving accessibility, increasing intuitivity and implementing power user features - all while avoiding unwelcome and unnecessary changes in interface and terminology. One fundamental change has taken place, however; the new implementation can be used simultaneously by the timetablers and its administrators.

2.2 Justification of design

This implementation makes extensive use of Excel's VBA macro capability in order to present the data entry process as a form, allowing generous use of autocomplete functionality. This constrained use of input navigation should result in a faster rate of data entry by timetablers and leave them happier with the process [Cockburn, 2010].

Buttons are symmetrical, of uniform size and spacing and have sensible labelling. The crucial "add request" button is displayed prominently at the top of the page and menu choices are fairly obvious. Combo boxes have been used where possible. These decisions aim to provide users with a consistent experience whose direction is clearly obvious, as recommended by Hick-Hyman and Fitts respectively [Seow, 2005] [Gross, 2011]; one can assume that timetablers will find the

experience tolerable if they can understand the path to take [Porter, 2003].

Since the system pulls module codes and titles from an external source and utilises a programming language accessible to people who aren't necessarily programming-oriented [Burnett, 2003]; it is hoped that the system will be more flexible in terms of future iterative development than its predecessor. This would be an ideal scenario for a small development such as this where functionality will naturally evolve [Misra et al, 2012].

2.3 Limitations of design

Unfortunately, some functionality is inherently difficult to implement with a spreadsheet. One specific and relevant example here is support for multiple room requests, which is not directly supported and requires use of the comment box.

A small percentage of timetablers will require 15 weeks of bookings. This is three weeks more than the majority of timetablers require. In compromise, this small group will be required to enter this information into the optional comment field, as with the multi-room request outlined previously. This keeps the form's interface simpler for the majority who don't need this functionality.

Acceptable security is not feasibly possible with a spreadsheet system [Havenstein, 2006]. By simple Internet searching, anyone can obtain sufficient information to bypass whatever security system is in place (including the system used here). This is regrettable, but a spreadsheet-based system has survived on good faith until now and it can be reasonably expected to continue to do so.

Regrettably, the VBA used to drive the macro system here is not cross-platform friendly; timetablers would be required to run the Windows operating system to access the spreadsheet (not a limitation they currently cope with). A website would be free of this limitation.

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3 Static website

3.1 Summary of design

The static website prototype replicates the replacement spreadsheet but in a more user-friendly form and with additional functionality. A website notably differentiates itself from a spreadsheet in that it is able to easily present the same information in several different ways; this is a valuable capability in this situation and has been made use of here.

The design is simple in nature and includes a form entry system in line with that outlined in the case of the spreadsheet. Functionally, the website differs from the spreadsheet in its dynamic presentation of information and use of more intuitive feedback. It similarly implements a password system, albeit without the security concerns present in the case of the spreadsheet.

3.2 Justification of design

The website shows the remaining time in each round. It even supports saving during the process of adding a single record, despite each record's small size; this hints at the principles behind its design - the system provides feedback and involves the timetabler in the overall process. This is sure to provide reassurance to the timetablers [Hsiao & Chou, 2006].

This is the justification for the launch page being an information summary. Information regarding existing, but not yet submitted, requests is viewable either as a list or in a graphical manner. The default in this case is graphically, since this is the best way to provide a summary of the present situation [Hsiao & Chou, 2006]. This is done by imitating the familiar format of the institution timetable itself (by breaking the view down by individual module).

In line with Gestalt's research on psychology, navigation headers are clearly differentiated from the rest of the page by virtue of their leading position while their close proximity to each other only further emphasises their relevance [Hsiao & Chou, 2006] [Möller, 2012].

To minimise training required and make the transition from the existing system as smooth as possible, the same headers and terminology as used in the current system have been used throughout the website - companies such as Apple have made a huge success out of offering this kind of consistent user experience [Allen, 2011].

Design-wise, the prototype presented integrates nicely with the institution's existing web system. This was not specified and is not necessary, but serves to provide a reasonable impression of what is possible with the use of a web system (and highlights what is not possible with the use of a spreadsheet system).

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4 Integrated intranet and database system

4.1 Rationale

The ideal solution would be to deploy an integrated intranet and database system. This would allow the most benefit to be extracted from the unavoidably disruptive process of changing the system fundamentally [Alder, 2007].

An integrated system would allow timetablers to view round results easily as part of one system (not feasibly possible using a spreadsheet). Restricting data visible to each timetabler to only that which is relevant to them is much easier with an integrated intranet and database. Centralisation of data is also possible, preventing the need for multiple files to be sent back and forth between users. Compatibility with timetablers' own devices and software is easier to maintain with a web-based system in comparison to a local spreadsheet and would allow users to use their own devices (further supporting a consistent user experience) [Thomson, 2012].

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5 Conclusions

5.1 Requirements

With regard to the assigned task the requirements have been met in full. The provision of a replacement spreadsheet system whose functionality is at least equal to the outgoing system, but which is noticeably easier to use, has taken place.

5.2 Recommendations

It is recommended that the current system be replaced as it is archaic in design and unfriendly to use. However, the replacement should not be the new spreadsheet which was commissioned (which is in essence a prettier version of a fundamentally flawed system), but instead a new database-centred system which integrates pleasingly with the existing IT infrastructure.

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