Rethinking the final year project report – cutting out the waffle

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Department of Mathematical Sciences

**CETL-MSOR 2015: Sustaining Excellence** 09/09/2015







## i.e. module; unit

- Final year research methods and project course (30 credits)
  - One of three 30 credit options, including UAS and MWP
  - Taken alongside 90 credits of options (15 credit courses)
- Two projects undertaken:



**Group Project** 



**Individual Project** 



## **Assessment Profile**











## **Assessment Profile**







of GREENWICH

## Mathematical Sciences



In 2012, the University's academic calendar and term structure was changed.

- Following recommendations from the UG-Flex project<sup>1</sup>, a trimester calendar was introduced.
- This resulted in the research methods and project students having a significantly shorter time to write up their research.
- As a result, the individual project assessment was redesigned.

<sup>1</sup>JISC, 2012. Proposal to amend the University of Greenwich Academic Framework [online] UG-FLEX proposal to amend academic calendar May 2012. Available at:

<a href="http://jiscdesignstudio.pbworks.com/w/file/56172993/UGFLEX%20proposal%20to%20amend%20academic%20calendar%20May%202012.pdf">http://jiscdesignstudio.pbworks.com/w/file/56172993/UGFLEX%20proposal%20to%20amend%20academic%20calendar%20May%202012.pdf</a> [Accessed 19 June 2015]

**Department of** 

**Mathematical Sciences** 





A seven-page "research paper" style report was specified,

 cognate to journal articles necessarily encountered by students as part of their research.

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A template was designed with rigid formatting requirements,

 akin to the specifications of academic journal and conference publications.



#### Mathematical Sciences Individual Project Report

Course tutors: AL Hunt and D Quibell A report submitted in partial fulfilment of the

Project Supervisor: Type your supervisor's name here

Research Methods and Project Course (MATH 1048)



#### TYPE YOUR TITLE HERE

#### Type your name here

9 April 2015

#### 1. ABSTRACT

University of Greenwich

Your abstract should summarise the work you have undertaken during your research project. You should explain what the report is about, what methods you have used, what results you have found, and a brief discussion of the conclusions that you have drawn. It is important to emphasise why the work is important (i.e. what problem has it helped to solve?) You should aim for 250-300 words in this section.

#### 2. FORMATTING

All text in this report should be in the font Times New Roman, size 12 and justified. Main headings should be left-aligned and numbered in BOLD CAPITALS as demonstrated in this template. You may also include sub-titles; for example the following section is labelled 2.1.

You may not exceed the length of this template. You will see that the footer has been specified so that the main body of the report must fit within seven pages (max 6000 words), with two pages for references followed by appendices. The margins must remain as formatted here (set at 2.54 in each edge).

You should use a formal academic writing style: for more information about report writing, see lecture material. You must ensure that you use references to support your claims in the text as well as providing a list at the end. Here is an example sentence:

According to Odom et al. (2009), group work is beneficial to students undertaking research projects as it helps to promote active learning.

#### 2.1 Figures and Tables

Figures and tables can be included in the body of the report, or as appendices at the end, or both. In the body of the report, all tables should be centred on the page and numbered with a bold title centred above the table, as depicted in Table 1. All figures should be numbered

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centred on the page and with a **bold title centred below the figure**, as depicted in Figure 1. Every table and figure must be referred to (by its number) in the body of the report.

Table 1: Potato Crisp Packet Sales in the UK from 2004-2014 (in millions)											
BRAND	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Kngs	1.2	1.9	2.0	1.9	1.7	2.1	2.2	2.2	2.4	2.1	2.2
Tytos	4.4	4.7	4.6	4.7	4.7	5.0	4.8	4.8	5.1	5.2	5.5
All other	3.3	2.5	2.7	1.8	3.4	2.6	2.6	2.7	2.2	2.4	1.9

In the same way, all appendices must be numbered and referred to in the body of the report. You should make your own tables and figures as much as possible. If you wish to use something that someone else has made, you must reference the owner, for example in Appendix 1, where data from a website has been used to compile a table (The Sunday Times, 2014). Another example is in Appendix 2, where a figure from an ebook (O'Leary, 2014) is referenced.



Figure 1: Potato Crisp Packet Sales in the UK from 2004-2014 (in millions)

Below are some example report body headings. You are not required to use these headings, as the sections needed for your report will depend on the content of your own topic. However, your own material should reflect these areas in some way.

#### 3. INTRODUCTION AND BACKGROUND

You should include an introduction to your topic. Aim your writing at the level of an educated non-expert: someone with a good knowledge of mathematics, statistics and operational research (e.g. second year of your degree), but without any specific knowledge of your chosen subject. You must demonstrate that you have researched the area and provide references in support of your findings.

#### 4. METHOD AND APPROACH

When explaining the work that you have undertaken in your project, you should clearly specify the approach you have taken. Why have you chosen this approach? What other approaches have you considered? Support this discussion with references.

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The scope of the project remained:

• Students reported on a significant academic project undertaken in a maths, stats or OR topic, integrating and expanding their knowledge from taught courses.



But in order to fulfil the specification, student report-writing needed to be:

- Focussed and strictly relevant
- Concise and succinct



The PDP element (logbook) was also redeveloped to focus project choices on employability and/or future study.







## New Template

#### Mathematical Sciences Individual Project Report

Course tutors: A L Hunt and D Quibell

Project Supervisor: Nadarajah Ramesh

A report submitted in partial fulfilment of the University of Greenwich Research Methods and Project Course (MATH 1048)

#### Is there a relationship between the patient experience of care and the experience of staff working in the NHS?

#### Waleed Backler

#### 8 April 2015

#### ABSTRACT

This project investigates patient and staff experience in NHS England. The project links the results of the 2013 acute inpatient and staff surveys using a series of statistical analyses intended to highlight the most important relationships between the two surveys. Firstly, a correlation analysis was conducted on trust-level results for both surveys. Following this, an exploratory factor analysis of the data was undertaken to discover possible constructs underlying the data in both the surveys. Finally, regression models were constructed to discover the areas of staff experience that have a significant importance towards the overall patient experience. A number of themes are apparent: bad treatment by staff of patients (whether via bullying, harassment, abuse or discrimination) is associated with poorer patient experiences. There is also a significant link between patients being confident in the doctors and nurses treating them, and staff recommending the trust as a place to work or receive treatment. The most straightforward association to interpret is that between recommendation of the trust and positive patient experience: it appears that both staff and patient responses identify good provision of healthcare, and it may be that this item in the staff survey prompts staff to evaluate care from the patient perspective. This work indicates that there is a relationship between patient and staff experience in the NHS. The results of this project will be used to give greater insight to NHS England analysts and policy teams with regards to the relationship between patient and staff experience.

#### ACKNOWLEDGEMENTS

I would like to thank the following for their support during the course of this project:

- Dr Nadarajah Ramesh for supervising my project.
- Ms Aoife Hunt and Mr Dick Quibell for running the lecture series to help prepare me for the project.

#### 1. INTRODUCTION AND BACKGROUND

This project investigates patient and staff experience in NHS England. The main aim of NHS England is to improve the health outcomes for people in England by providing high quality care for all, now and for future generations (NHS England, 2014a). Patients say that they care about their experience of care as much as clinical effectiveness and safety (NHS Institute for Innovation and Safety, 2013). NHS England has a patient survey programme which gathers

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# Appendices, including full data, modelling and tool development.





Appendices dealt with the nitty gritty detail – large tables, graphs, and code.

GARCH vs. GARCH-M MODELS IN FORECASTING					
VOLATILITY AND RETURNS FOR HOME RETAIL GROUP			_	APPENDICES	_
Louise Patricia Murphy		Appendix 2:	The da	ata required to carry out cost benefit as	nalysis
		Parameter	Variable	Description	Data
9 April 2015		Fire Detection Type	Det	Fire Alarm/Personnel detection Probability of detection in fire (0-1)	Arun Client Data
5 April 2015		False detection likelihood	FLDet	Probability of false detection of fire (0-1)	Arup Client Data
	2	Time taken to detect in Fire	T <sub>Det</sub>	Detection time (seconds)	Nominal
		Type of Suppression Systems	Sup	Sprinklers	
COMPUTATIONAL NUMERICAL ANALYSIS OF		Suppression likelihood (T)	DL <sub>Sup</sub>	Probability of suppression released in fire (0-1)	Nominal Values Assigne
		Suppression likelihood (F)	FL <sub>Sup</sub>	Probability of suppression released when no fire (0-1).	-
PLANETARY ORBITS		Time taken to suppress a fire	T <sub>Sup</sub>	Time taken to suppress fire (in terms of severity)	
		Evacuation time	T <sub>c</sub>	Time taken to evacuate the zone given the alarm has been raised (seconds). Function of detection/notification.	Quicker when evacuating less compartments
Tom Jordan		Staff return time	Rc	The time taken to return to work after evacuation. Dependant on fire severity (function of: type of fire, detection time (spread, suppression, <u>etc</u> )	Zero if $B_{e_x}$ is above a threshold.
9 April 2015		Identify compartments	с	c = 1, 2, n.	_
8	delling	Back-to-business Time	Bc	Equipment etc: per compartment type and its damage rating. Zero if mandatory drill	Nominal values assigner
	W	Business disruption factor	Dc	Business disruption factor per compartment (c). (£/seconds)	
		Descriptive scenario	-	Building Type (e.g. office), fire/non-fire scenario, time, population etc.	
Dynamic Population in Artificial Bee Colony Algorithm	Scena	Compartment of fire origin	0		[Scenario dependent]
		Fire severity	S	Severity level - (0 is NO fire)	
		Detection provision in	Detc	The detection method proposed for compartment c	
Dmitry Dereshev		Suppression provision in	Suppc	The suppression method proposed for compartment c	-
9 April 2015		Population in	Pc	Given expect timing of scenario.	-
9 April 2015		Likelihood of fire in compartment	L <sub>c</sub>	Given expect timing of scenario.	
	4	Connectivity/ compartmentalisation matrix	C <sub>lj</sub>	From compartment <i>i</i> to compartmentalisation <i>j</i> , $C_{l,j}$ = compartmentalisation time (minutes) $C_{1,1}  C_{1,2} \dots  C_{1,m}$ $C_{2,1}  C_{2,2} \dots  C_{1,m}$	
THE COST BENEFIT ANALYSIS OF COMPARTMENTATION IN A				$C_{n,1}$ $C_{n,n}$ (When $i = j, C_{t,j} = 0.$ )	
CORPORATE BUILDING TO ASSESS BUSINESS DISRUPTION		Damage rating per zone	D <sub>c</sub>	(0-1) Function of <u>severity</u> S, spread (compartmentalisation C <sub>(i,f</sub> ), and suppression.	
COSTS IN FIRE AND NON-FIRE SCENARIOS	Cos	Overall system cost	£OS	Cost of detection/suppression systems over the lifecycle of the building.	
Vaichali Shah		aniting feadbo	ck loop	ADDCars, Lach chine	r
9 April 2015		a better solutio	n.	appears -	



Background New Template Example Reports Feedback

- Students learned how to structure their research according to this concise format, and communicate their findings in a succinct manner.
  - We found that this effectively focussed the students' writing in the main body of the report and that they could still demonstrate their work comprehensively in the appendices and deliverables.
- Embarking on the writing seemed less daunting for students.
  - However this may have delayed the start of writing!
- Students conducting their individual research in response to an employer brief produced reports in this format that were fit-for-purpose in conveying their findings to an end-user or client.



Background New Template Example Reports Feedback

- In this format, research itself provides exemplars for writing and research style, as well as previous submissions.
- When marking these submissions our supervisors, moderation panel and external examiners commented that the succinct report style enabled discrimination between the varying quality of work:
  - students have "nowhere to hide" when there is little room for superfluous information in their reporting.





- Employers and visitors to our graduate showcase, including academics from maths departments at other universities, commented that the general quality of the projects was very high.
- Our external examiners and moderation panel found the standard and topic difficulty were comparable with previous years.
- One external commented on the strong potential for the "research paper" style project and recommended: "staff involved in co-ordinating the project module to monitor and 'fine- tune' (if necessary) the changes they have introduced, and to consider disseminating this innovation to the wider MSOR community."





We are continuing to "tweek" in our third year of using this format:

- Report length (in the first year, 5 pages plus references and appendices was found to be too short).
- Marking schemes that emphasise orthogonal elements to more clearly benchmark grade boundaries.
- Tutorial activities using example projects as a basis (e.g. peer review and work planning exercises).



We had initial concerns about students progression to further study.

• However we found that students did progress as usual to MSc and PhD programmes at a variety of institutions.







