CSCM10: Report - Gamification

Andrew Gray
445348

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Swansea University
Prifysgol Abertawe

Department of Computer Science
Swansea University

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Abstract

As part of the module for CSCM10, we need to create a report that explains a subcategory of our masters' dissertation. In this report, we will look at how gamification creates the desire to keep the user engaged as well as reinforcing any potential learning taking place, through motivation techniques and incentives.

We will, in this report, be exploring the background of gamification, as well as aspects like how gamification, in science, is currently used. In this report, we will also reflect on how to take scientific ideas, for example, Machine Learning, and applying gamification practice to them. While also taking into account the additional aspect of integrating gamification within education and teaching.

Acknowledgements

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Chapter 1

Introduction

This report aims to research the concept of gamification. Exploring what it is, by exploring its background, as well as how gamification, is applied within education. As well as aiding fundamental teaching concepts, especially within a science context. With the aim of the findings creating a foundation for the author's masters dissertation.

1.1 Motivations

Large documents can become cumbersome to work with and format consistently. Sensibly chosen aesthetic cues are important to help imply structure and can greatly aid the reader in understanding your work. The accompanying LaTeX template uses abstraction to hide the formatting from the author during content preparation, allowing for consistent styling to be applied automatically during document compilation. In this Google Docs theme it is the responsibility of the author to manually adhere to the styling laid out in this template.

1.1.1 Objective

In this report, we explore what gamification is, what it consists of and how it can aid and reinforce the teaching and learning, while keeping the product engaging as well as incentivise the user to return.

1.2 Overview

The remainder of chapter 1 outlines the document structure. This report contains chapter 2, which, researches into the background of gamification. This chapter also reflects on have gamification is used within a Science context. The chapter also looks at researching potential ways of applying gamification techniques to science concepts/ideas. An example this is through using potential appropriate user engagement and incentivisation techniques teaching key machine learning concepts. Also on the impact gamification has had within education and how it can aid teaching while reinforcing learning and attainment levels. Furthermore, lastly in chapter 3, we summarise the main contributions and main concepts into gamification.

Chapter 2

Background into Gamification

The university has subscriptions to a vast number of major academic journals spanning a wide range of subject areas. By accessing the internet from a university network connection (Eduroam or Ethernet), the paywalls of many journals will simply vanish without any need for login credentials.

2.1 Tunnel your internet connection via the university internet

When you are working from outside of the university then connecting to an on campus machine via remote desktop (RemoteDesktopProtocol, TeamViewer, ect) or via port forwarding (ssh, ssh tunnel, ect) can allow you to access papers that would otherwise be behind a paywall.

If you do not have individual access to a machine that is exposed for ssh on the university network you can always use the computers in Linux Lab CF204[1] for the purpose of setting up an ssh port tunnel to proxy your internet through. These machines have fixed IPv4 addresses and respond to ssh using your student account credentials. While in use your internet will be routed[2] to the university and then out to the internet, granting you transparent access to journals without a paywall.

[1] One caveat of using computer lab machines for remote tunnelling is that a environmentally conscious student who has worked late in the computer lab might choose to switch off the machine you were using...

[2] Painfully slowly.

2.2 Practice your Google Fu

The internet is big [1]. Knowing how to phrase a question to a search engine is therefore an invaluable skill. If the request is simple enough, even a poorly structured query will likely return usable results. For more difficult to find resources you can leverage the language of the search engine to gather relevant papers and resources for your research more efficiently.

`https://www.gwern.net/Search`

"Internet Search Tips" [2] provides an excellent review of methods and tips for scouring the internet for hard to find resources. You will also be less likely to get caught behind journal paywalls when working remotely without a tunnel as your queries can be made to look for raw pdfs that are often released by the authors directly.

2.3 Organizing your citations in BibTeX

BibTeX is a language for specifying resource citations. Every time you access and read an academic paper, take code from an online repository, or source the media such as images from existing works you should create a BibTeX entry in a file that you keep throughout your research. Software such as Mendeley [3] can help automate the process of building your BibTeX library of citations.

```
@INPROCEEDINGS{kaj86,
    author    = {Kajiya, James T.},
    title     = {The Rendering Equation},
    booktitle = {Proceedings of the 13th Annual Conference on Computer Graphics
        and Interactive Techniques},
    year      = {1986},
    series    = {SIGGRAPH '86},
    pages     = {143--150},
    address   = {New York, NY, USA},
    publisher = {ACM},
    isbn      = {0-89791-196-2},
    numpages  = {8},
    acmid     = {15902}
}
```

Listing 2.1: An example BibTeX entry for an academic paper published in conference proceedings [4].

The BibTeX code listing above (listing 2.1) shows an example of how to cite an academic paper, in this case one of the central papers in Computer Graphics research. The key **kaj86** is

an arbitrary name chosen as a meaningful identifier for the resource. In the document text we can call on this resource as an inline citation using the LaTeX command `\cite{kaj86}` which produces [4] at the location it is called. As long as a citation has been used at least once somewhere within the document then a formatted full citation will be created in the bibliography at the end of the document with the same citation number that is shown inline.

It is considerably easier to be disciplined in methodically taking note of the resources you access and make use of as you access them, than it is to try and hunt them all down again at the time you need to write about them in your document. Invest time in being organized and consistent up front and it will be easier when you come to write up.

2.4 Properly using and formatting citations within the text

Usually you would not put the URL of the resource you are citing directly in the text like is done previously in section 2.2. The citation for the resource [2] is sufficient to reference it within the text given that full details of its location are then kept neatly within the bibliography at the end of the document.

In normal usage the purpose of a citation is not to direct the reader away from your thesis, but to justify and back up assertions you are making about the state of the domain. If a reader questions your assertions then they can follow the rabbit hole of papers which will likely also make and justify assertions with even earlier papers from the literature.

In the above case the intention is for the reader of this template to actually go to that resource and read what it has to say directly. The link is therefore shown clearly within the main text to indicate that the reader should visit it. This as opposed to wanting the reader to purely acknowledge that the facts which are within the resource legitimize the points made in this document, in which case a simple inline citation is the best way to back up your assertions. Section **??** specifically touches on the best practice for how to cite images which you are importing from existing work.

Chapter 3

Conclusions and Future Work

In this document we have demonstrated the use of a LaTeX thesis template which can produce a professional looking academic document.

3.1 Contributions

The main contributions of this work can be summarized as follows:

- **A LaTeX thesis template**

  Modify this document by adding additional top level content chapters. These descriptions should take a more retrospective tone as you include summary of performance or viability.

- **A typesetting guide of useful primitive elements**

  Use the building blocks within this template to typeset each part of your document. Aim to use simple and reusable elements to keep your document neat and consistently styled throughout.

- **A review of how to find and cite external resources**

  We review techniques and resources for finding and properly citing resources from the prior academic literature and from online resources.

3.2 Future Work

Future editions of this template may include additional references to Futurama.

Bibliography

[1] Internet Live Stats. (2020). [Online]. Available: https://www.internetlivestats.com

[2] G. Branwen. (2020) Internet search tips. [Online]. Available: https://www.gwern.net/Search

[3] RELX Group. (2019) Mendeley. [Online]. Available: https://www.mendeley.com

[4] J. T. Kajiya, "The rendering equation," in *Proceedings of the 13th Annual Conference on Computer Graphics and Interactive Techniques*, ser. SIGGRAPH '86. New York, NY, USA: ACM, 1986, pp. 143–150.

[5] Overleaf. (2020) Overleaf documentation. [Online]. Available: https://www.overleaf.com/learn

[6] Stack Overflow. (2008) Tex stackexchange. [Online]. Available: https://tex.stackexchange.com

[7] A. Ravikumar. (2019) Texnique. [Online]. Available: https://texnique.xyz

[8] J. Whittle. (2015) Path traced glass dragons.

Appendix A

Implementation of a Relevant Algorithm

```
#include <stdio.h>

int main(int argc, char *argv[]) {
  printf("Hello world.\n");
  return 0;
}
```

Listing A.1: An implementation of an important algorithm from our work.

Appendix B

Supplementary Data

The results of large ablative studies can often take up a lot of space, even with neat visualization and formatting. Consider putting full results in an appendix chapter and showing excerpts of interesting results in your chapters with detailed analysis. You can use labels and references to refer the reader here for the full data.