Analysing the impact of adapting online advertising content according to user behaviour and profile groups, within the domain of the tourism market.

Aisling Cowzer
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Supervisor: Dr. Alexander O’Connor

School of Computer Science and Statistics
O’Reilly Institute, Trinity College, Dublin 2, Ireland
DECLARATION

I hereby declare that this project is entirely my own work and that it has not been submitted as an exercise for a degree at this or any other university.

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Name                                                                                   Date
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Chapter 1 Introduction

This chapter will outline the direction and motivations of the project and begin to describe the external environment to which it relates.

1.1 Motivations

Targeted advertising is an everyday element of online activity. From search engines, to social networking\(^1\) sites, users are being presented with advertisements ‘targeted’ to their ‘needs’. How well matched these needs are however is debateable, and consumers have a high perception of manipulation by advertisers when these adds are particularly obtrusive [1].

With the expansion of social networking sites such as Facebook and Twitter, organisations can communicate with consumers in a way like never before [2]. Online communication between businesses and consumers has developed from solely presenting content on static web pages; to a relationship where content is contributed from both sides and personal investment is from each party [3]. Despite this changing relationship, advertising online remains very much ‘mass market’ in its approach [4]. While steps have been taken to provide a more targeted approach, content and key word matching remain top targeting methods pursued by businesses [4]. These matching techniques do not best utilise the information available to companies about who is sitting in front of the computer screen.

Several techniques of personalisation are already in use in the online domain, most recently ‘Personal Information Retrieval’ and ‘Adaptive Hypermedia’ systems which can be seen to emerge within online customer services especially [5][6].

Progression from ‘targeted advertising’, to an alignment of the user’s needs and desires with the offering of the product\(^2\), through personalisation of advertising, is the direction the market needs to take. Today’s consumers expect personal communication from their brands and the technological tools are there to facilitate it [7][8].

\(^1\) The terms ‘social network(ing)’ and ‘social media’ will be used interchangeably throughout the document as no distinction between the two can be identified.

\(^2\) The term product in this document will refer in all cases to both product and services.
1.2 Research Question and Objectives

1.2.1 Research Question

It will be explored whether a segmentation\(^3\) method similar to that practiced within traditional advertising channels such as television and radio, can be applied to online marketing. The segmentation method proposed within this project uses persona based profiling.

An experiment employing the model will be carried out to analyse the impact such segmentation has on the recall ability of, and the relevance of the imagery to the online user, amongst other measures.

1.2.2 Research Objective

The primary objective of this project is to better align the activities within the online marketing environment with both the academic literature on the role of businesses online, as well as with practices of personalisation of online experiences to users based on their interests, needs and preferences.

1.3 Research Challenges

1.3.1 User Information

Three main streams of information on the activities of online users currently available to businesses and organisations are identified;

1) Analysis of online activity with tools such as Google analytics
2) Activity of users on social media,
3) Direct communication with consumers, facilitated through both online and offline channels.

\(^3\) Segmentation will be defined in Section 2.2.1 ‘Segmentation’.
For this project however, such resources were not available. Privacy issues surrounding the sharing of data on consumers, as well as the competitive value associated with this information restricts what companies are able and willing to share. To overcome this, a system of questioning participants to gather information and subsequently create their personal persona was developed.

1.3.2 Industry Domain

Advertising online, especially within social media provides a unique opportunity to communicate with the consumer at every stage of browsing, purchasing and using the product [3], i.e. the ‘decision making journey’.

![Figure 1, Consumer Decision Making Journey][9]

By understanding the decision journey of consumers, marketers are able to influence it [2]. As such, in forming a method for personalised online advertising a clear understanding of this journey is. These decisions are industry specific and a single industry was selected for
this project; the Tourism Industry. This decision allowed clarity in the segmentation approach as clear motivations to purchase in this market were studied.

1.3.3 Personalisation

The academic literature on personalisation presents possibilities of personalising many aspects of the online experience [5].

Two primary factors which influenced the decision to personalise solely the content displayed and not also layout are;

   a) Should many changes be made to an otherwise familiar environment it can distort the resulting statistics [4].
   b) Obtrusive of online display advertising alongside personalised content can be ineffective [1].

1.3.4 Participants

In recruiting online participants to take part in the experiment a demographically varied sample population is required to;

   a) Present a valid representation of online users
   b) Increase the likelihood of each of the segments having one or more participants as members

1.3.5 Privacy

In creating the segmentation model to be employed in the ‘real’ environment, established tools are referred to so as to avoid the creation of new privacy concerns amongst online users.

Participants of the online experiment do so anonymously. Personal demographic information is also provided by the way of ‘bands’ to form a collective of participants within each and avoid participants being entirely unique and in anyway suggestive of their real identity.
1.3.6 Online Experiment

Online experimentation is not just an offline experiment put online [10]. Specific controls in the simulation environment were utilised to address the risk of over-subscribers and ensure the validity of those participating. Also, in line with the ethical policy of the School of Computer Science and Statistics, Trinity College Dublin all participants must be over eighteen [Appendix 1]. A form requesting participants to confirm or deny their age placed the responsibility on the participant to comply with the stated conditions.

1.4 Technical Approach

The project is divided into three specific phases and each is detailed below;

- Research
- Experimentation
- Analysis

1.4.1 Research and Background

Academic literature specific to destination (tourism) was reviewed to gain insight into policy and practice in current practice [11][12][13]. A range of supporting domains were also reviewed and included most notably; destination marketing, online marketing, personalisation of online experiences and crowd sourcing.

1.4.2 Experimentation

The online experiment had two functions. Firstly it gathered information on participants who represented online users and to facilitate the profiling process. Secondly, it analysed the impact of applying personalisation to online marketing.

The experiment was live on the website: www.fyp9.com, hosted by DigiWeb [Appendix 2], and was accessible for three full days. A total of sixty nine participants registered with the site, of which there were fifty three valid submissions completed[Appendix 3].
1.4.3 Analysis

An external database with PHP was used to store all the information collected through the experiment. An analysis of all the collected data was carried out offline, utilising the Microsoft Excel software. The software of choice presented suitable functionality and user interface to carry out this analysis, and present it in a readable format efficiently.

1.5 Conclusion

The aim of this project is to analyse the impact of adapting marketing imagery based on the persona of the individual online user. The method of personalisation arose from a combination of academic literature review, research into the relevant industries policy and practice, and an online experiment. Emerging risks and limitations were addressed as outlined.
Chapter 2 Background

This chapter sets out the external environment to which this research relates. The contributions to the profiling approach adopted are introduced along with details of the method.

2.1 Introduction

Current online marketing is dominated by two targeting techniques; matching of content and the matching of key words. A profiling element can be found in this practise, with users’ behaviour and content they view, being aggregated to formulate a profile [4].

The internet however has become a sharing platform. The emergence of Web2.0 has seen users browse the web not just to gain insights, search for information and be entertained, but to ‘share’ and contribute material through forums, blogs and channels such as YouTube, with other users. All of this communication has left a trail of data behind providing valuable information about the type of person who is sitting at the other side of the computer screen. Opportunities to ‘personalise’ rather than ‘target’ the products offerings to online users is also supported by the emergence of social media within the last five to ten years. Companies now have millions of ‘friends’ who are willing to share personal information and interests with them, as well as participate in, and guide product development [3]. These individuals are actively pursuing ways to build a relationship with their brand [14].

Analysis of online user activities is being carried out by large corporations such as Google and Facebook. Companies need to turn this data into knowledge and utilise it to better address the needs of their consumers [15].
2.2 Contemporary Marketing

“The new consumer wants to be addressed in personalized ways and with customized messages that reflect individual preferences”

(Windham and Orton 2000; [16])

A shift in identifying consumers through personal attributes as opposed to mass market, demographic factors has occurred within the broader marketing domain over the past decade. Most notably, the pan disciplinary movement coined ‘Post –Modern’ marketing, has seen the consumer become more ‘advertising literate’ and weary of the messages in advertisements [17]. This has seen advertisers no longer ‘telling’ the consumer about the product, but rather aligning the needs, desires and dreams of consumers and the offering of, and the experience created with their product.

2.2.1 Segmentation

Segmentation is a term to describe the division of the consumer market into segments, using a wide range of variables across demographics, behavioural and psychographic variables [2]. These segments represent groups of consumers with similar interests, and who share the same expectations and potential uses for the product. It is common in contemporary practice for marketers to select a small number of the most attractive segments to target [2]. The remaining identified segments are not included in immediate communication or product development.

The immediate and direct communication facilitated by the internet provides the opportunity to simultaneously address multiple segments and to do so accurately with a message personalised to the individuals needs, interests and desires, i.e. psychographics.
Five segments of the tourism market were identified using psychographic variables aligning to the work of Plog [18].

2.2.2 Plog

An influential author in the field of destination (tourism) marketing is Plog (2002). Developed within his work is a scale of ‘motivations to travel’ for the consumer. He argues that these motivations are more indicative of the factors influencing consumers to travel than typical demographics.

Plog finds that a consumer’s position on the ‘Venturer-istic’ scale shows a stronger indication of their motivation to travel than household income [18].

![Plogs' Venturistic Scale][18]

However, “(f)or travel suppliers, media uniformly use demographics to describe their audiences, not psychographics”, [18]. The two extremities on the scale of venturesomeness are ‘Psychocentrics’ (Dependables) and ‘Allocentrics’ (Venturers).
Dependables

- Follow lead of others
- Indecisive
- Low-level dread/anxiety
- Desire to make safe and comfortable decisions
- Primarily use named-brand products (If everyone uses them they can’t be bad)
- Return to same spot, maybe even annually
- Sun-fun spots similar to home with fast-food, games rooms etc.

Venturers

- seek out new destinations and rarely return to places they have previously visited
- adapt to area by eating local food/less adequate accommodation
- comfortable if they don’t speak the language, high self-confidence
- Use air travel heavily. Influence friends and family

2.2.3 Segmentation Model

Plogs’ model of segmenting the tourism market forms the basis of the segmentation model employed in the project. The five segments identified are defined purely by psychographic variables [Appendix 4]. These profiles are briefly outlined below;
<table>
<thead>
<tr>
<th>Segment Name</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| a) Explorer          | Will travel to unknown locations  
                        Plans very little in advance  
                        Often travels alone  
                        Will stay in the ‘real’ environment |
| a) Adventurer        | Will travel to unknown locations  
                        Will plan accommodation in advance  
                        Looking to experience ‘authentic culture’ |
| b) Planned Adventurer| Will travel to new locations on advice of friends  
                        Will plan majority of trip before arrival  
                        Looking to explore in safety |
| c) Variety Traveller | Goes on ‘package’ holidays, possibly all-inclusive  
                        Looking to explore and travel in comfort  
                        Likely to go on an organised tour |
| a) Old Favourite     | Makes multiple trips to the same location  
                        Does the same activities abroad as when at home  
                        Looking for relaxation |

*Figure 3, Overview of Five Personalisation Segments*

2.3 External Environment

Several techniques of personalisation are already in use in other online markets. Most recently ‘Personal Information Retrieval’ and ‘Adaptive Hypermedia’ systems are currently being introduced to the online customer services domain [5]. Large online players such as Google and Facebook have analytical tools to compliment and support the formulation of online advertising campaigns and the impact of promotional activity also.
2.3.1 Personalisation in Other Online Environments

Personalisation of content, layout and media type for example, are approaches which have been introduced into search engine results and customer services domains [6]. Recording users’ past behaviour and preferences is a practice currently employed to create a version of a user profile [4]. The primary goal of implementing such personalisation for the organisation is to facilitate an ease of access to content for their users [19].

2.5 Tourism Industry Analysis

In 2011 the global tourism industry contributed US$6.3trillion to global GDP\(^4\)[20]. Despite a challenging economical climate, the industry continued to perform well in 2012 and is predicted to continue to be a driver of global economic growth again in 2013[20].

Destination (tourism) marketing’s online promotional activities have largely been using the internet as an online brochure to date, and as such have not been best utilising the opportunities it presents (Wade & Rousso. 2006; cited in Chap 12 of [12]). Developing this one sided; information provision to personal communication with consumers highlights a move from a virtual information space to a virtual relationship space [12].

\(^4\) GDP, gross domestic produce
The personalisation approach employed in this project facilitates the move to a ‘virtual relationship space’. By identifying what motivates an online user to travel, personalised recommendations can be presented in the form of imagery and content to the user.

The use of imagery in destination marketing can play a crucial role in the decision making process of the consumer and acts as a key method of differentiation between destinations for the consumer both on and offline [11].

2.7 Conclusion

Users expect personal communication from organisations [17]. As such, progression from ‘targeted’ advertising to personalising the advertising to the individual is the direction online marketing needs to take. Segmentation through psychographic profiles similar to those presented by the work of Plog is applied to the test environment, and the results of which are statistically analysed. This analysis will evaluate the success of the personalisation model and determine if it is a possible tool to be employed by destination marketers in their move...
to achieve a personalised ‘recommendation’ element for their communication with online users.

The capabilities of online analysis tools such as Google analytics continues to grow. Through the identification of the key social influencers on social networking sites such as Facebook and Twitter organisations, particularly in the destination marketing field can align the knowledge they have about their online consumers to better personalise the advertising to the individual and select those capable of influencing others to spread their promotional message.
Chapter 3 Design

*This chapter provides an overview of the functions carried out by the online system. It also outlines the design decisions of the online experiment.*

3.1 Introduction

The majority of the design decisions for both the online system and the analysis of the experiment results were shaped by the research carried out in the relevant industries as outlined in Section 2 ‘Background’.

The system built is tested by an online experiment which analyses the impact of presenting varied images following a personalisation process aligned with the work of Plog.

To enable analysis of the experiment’s results, data is collected from the registration phase, through the psychographic profiling and on into the final survey. Data from both the information contributed by the participant, as well as the actions of the system itself is recorded. This data is stored on an external database; this process is detailed fully in Chapter 4, ‘Implementation’.

Carrying out this experiment within the online environment presented measurable risks and opportunities associated with the utilisation of online crowd sourcing. These risks, limitations and the subsequent controls put in place, including the registration system are further outlined in Section 3.4 ‘Online Experiment’.

3.2 Functions of the System

In its deployment into the real environment, the system will function as a backend program. It will analyse user activity to assess psychographic variables indicative of the users’ motivations in their tourism consumption decision making journey. The psychographic variables within the scope of this project include; influencer or ‘influencee’, exploring locations undiscovered or following advice of friends or their own experience and contribution to user generated content online.
These online activities can be analysed to identify an online user as more dominantly an ‘Old Favourite’ or an ‘Explorer’.

A characteristic of the explorer is that they go to unknown locations and on returning home share their experience with family and friends. This is the explorer encouraging those in their social circle to visit the country or location.

These tendencies can be aligned to everyday activities online, for example on social networks.

**Check-in**, i.e. the tagging of oneself in a location and sharing it with friends on Facebook, provides insight to the types of locations visited by an individual on a daily basis. This activity is more substantial than analysing users location purely based on IP address as it is an indication that the user enjoys sharing experiences with others.

The types of locations checked into too can indicate the level of ‘venturesomeness’ the online user exhibits. A check in to the opening night of a new modern bar or club can identify the user as being ahead of the crowd and exploring these new locations, even within their home environment.

An online user who likes and shares the check-ins of friends into new locations, or holiday photos from their excursions abroad provides insight into a more ‘Old Favourite’ disposition. Checking in and tagging large groups of online friends also shows a tendency to ‘explore in a group’, not a defining factor of an explorer.
In assessing the impact of such a system an alternative method of sourcing information about online users’ behaviour had to be identified. Information about participants was gathered through an online questionnaire made up of eleven questions on both demographic and psychographic topics.

Given the method of collecting data a scoring system was put in place to analyse the level of ‘Explorer’, ‘Adventurer’, ‘Planned Adventurer’, ‘Varied Traveller’ and ‘Old Favourite’ membership each participant displayed.

Using the participants’ answers for questions four to nine on the online questionnaire, a numerical score representing membership value to each of the five profile groups was calculated. Membership of multiple groups is facilitated in this system, as outlined above in Chapter 2, Section 2.2.3 and membership was therefore calculated as a percentage.
The psychographic questions are split into two sets;

**Independent**

The independent set, questions four, five and six all attribute a score value to the relevant profile given the user’s input to the questions.

**Dependent**

The dependent set increases specific profile scores in relation to the answers provided in independent set. These questions are numbers seven to eleven.

The specific profiling approach to calculate profile membership values is detailed in Chapter 4.

### 3.4 Online Experiment

The functionality required of the online experiment environment could not be facilitated through the use of online survey and crowd sourcing tools such as Amazon Mechanical Turk and SurveyMonkey⁵.

#### 3.4.1 Amazon Mechanical Turk

This system is a crowd-sourcing tool where participants are paid a nominal fee for carrying out small tasks. The wide demographic cohort this system presents was an attractive option for carrying out tests of the developed system as well as the online experimentation phase. However, geographical restrictions prevented the tool from being employed in the project.

#### 3.4.2 SurveyMonkey

Survey Monkey allows users to create an online survey for free. This survey can then be circulated through a link to recruit participants within social circles and through personal contacts.

Using a tool like Survey Monkey to develop the survey portion of the experiment was not sustainable given the requirement to access information stored in a database, and also the

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⁵ Surveymonkey.com
requirements to manipulate the results to carry out analysis which could not be completed using this tool.

The survey development process however was reviewed and influenced design components of the survey deployed on www.fyp9.com.

3.4.3 The Experiment

To provide the most relevant results, the experiment was carried out where the content was in its natural environment, online. Online experiments can be just as valid as those carried out within a physical test environment and further, provide the opportunity to carry out tests without the user being explicitly aware they are in an experimentation environment [10].

A registration method was included in the functionality of the system in order to discourage participants completing the experiment more than once. This was further discouraged through the staged process of the system. By spanning the experiment over four stages, not only provided a rich data set, but also made the experience lengthy, and so re-iterating the process was not attractive to participants.

In line with the ethics application made to the School of Computer Science and Statistics, each participant was guided through information pages detailing the requirement that they were each over the age of eighteen. This process is similar to that of the off-line experiment process.
3.4.3.1 Registration of Participants

An online registration system was employed to restrict each participant to completing the online experiment only once as multiple registrations of the same name were not permitted.

By creating a new instance in the database for each user as they registered with the system facilitated an amalgamation of all the information and activities relating to their specific run of the experiment.

3.4.3.2 Questionnaire

A universal questionnaire to be presented to every participant was constructed to gather demographic information, as well as travel preferences and habits [Appendix 5]. Each question must be optional to comply with the boards of ethics’ policy and so the option to ‘not specify’ was listed with each group of answers.
The demographic information collected through questions one, two and three is saved to the participants entry in the database and is next used in the analysis of the results of the overall experiment. This is comprised of two stages, the systems automatic analysis of the demographic composition of the dominant participants in each group, and the offline analysis of the overall experiment; measuring the impact of presenting images personalised through the segmentation model employed.

3.4.3.3 Store Profile Membership Values in Database

The membership score of the participant to each of the five profile groups is stored in the database. The profiles are also stored in a ranking system from ‘profileA’ to ‘profileE’ from the highest to the lowest membership scoring profile per participant (Appendix 6).

3.4.3.4 Present Content to the Participant

Both static and personalised content is displayed to the user following the questionnaire.

Static Content

The static content is presented to every participant regardless of profiling scores and demographics. This content is not matched to the images displayed as the personalised content and so a method of content matching is not used. The use of current and cohesive content presented in line with that seen by the average everyday user was important to create a realistic simulation environment.

Personalised Content

From the research into the destination marketing literature, it was decided to apply a personalisation approach to the imagery presented to participants. The images were used to represent advertising imagery and each participant was shown only three images per page aligned to the profile rankings they had scored through the personalisation process carried out by the system.

The system automatically updates the participant’s entry in the external database indicating which images were presented to the participant.
3.4.3.5 Present Survey to Participant

The participant is shown all ten images after viewing the content detailed above and is asked to answer three questions on each [Appendix 7], [Appendix 8].

Recall

The user is asked if they remember being shown each image across the previous pages.

Relevance

The participant is asked to rate how interested they would be in partaking in or visiting, the activity or location in the image. This question is put to all participants, regardless of the answer they gave for recall, whether or not this image was shown to them and to which profile it is related.

Uptake

The participant is asked to rate how likely it is that they would be partaking in the activity or visiting the location shown in each image within the next six months.

3.5 Conclusion

Altering a number of elements of an otherwise familiar environment, could potentially distort the results of a behavioural based study [21]. This risk, alongside the identification that imagery is a key influencer in the consumer decision making journey provided guidance on the selection of imagery as the personalised attribute in the test environment. It was further deemed appropriate to not alter page layouts nor media types for this reason. The possibility of future research into personalising these and further attributes is presented in Section 6.2 ‘Future Works’.

Information gathered at each stage of the experiment is stored in an external database to facilitate both the online and offline analysis.
Chapter 4 Implementation

This chapter combines the research presented in chapter 2 with the design features outlined in chapter 3 and details the building of the online experiment environment including some key code and screenshots of the system.

4.1 Technologies

The online experiment was developed using a combination of programming languages of web development tools.

- JavaScript and PHP were used to carry out analysis and perfume functions using participant input.
- Content displayed on the screen was presented using HTML mark up language.
- User ‘$_Sessions’ were activated through PHP to track participants’ progress through the experiment.
- mySql with PHP was used to connect to and update the database.

The website which presented the experiment, www.fyp9.com, is hosted by ‘Digiweb.ie’ through their student package.

Elements of package utilised in this project;

- FTP access
- MySql database
- Domain name and hosting
4.2 Handling User Input

The registration process acts as a method to reduce the likelihood of multiple submissions from one participant. PHP ‘sessions’ are used throughout the online experiment to track the participant at each stage. The session is only started once login (in relation to ‘ADMIN’) or registration has been successful.

```
$db_result = mysqli_query($con, "SELECT * FROM onlineUsers WHERE name='$desiredName'"); $num_rows = mysqli_num_rows($db_result)
if($num_rows > 0)
{
$nameValid = "false";
 echo "name entered already registered";
 &SESSION['user']='alreadySet';
 header("Location: createUsername.php");
}
else
$nameValid = "true";
 mysqli_query($con, "INSERT INTO onlineUsers (name, password)VALUES ('$desiredName', '$passwordA')");
 mysqli_query($con, "INSERT INTO impactSurvey (Username)VALUES ('$desiredName')");
 echo "You have successfully Registered";
 header("Location: successfulRegistration.php");
```
Should an attempt to register be unsuccessful, the participant is redirected back to the ‘createUsername’ page. Upon reading the $_SESSION[‘user’] value as equal to ‘alreadySet’, the page will display;

‘The name you have entered is already registered.’

Only the username needs to be checked at this stage as ‘createUsername’ includes a JavaScript function ‘validateForm()’ that verifies the format, length and proper validation of the username and password entered before the form can be successfully submitted.

Upon successful registration with the site, participants are further directed to a webpage detailing them of the ‘Survey’, its objectives and the anonymous nature of the data collected. After this a consent form is presented in compliance with ethical requirements of the School of Computer Science and Statistics.

Eleven questions are presented to the user to gather the information required to calculate their psychographic profile membership scores. All answers are selected from drop down menus of possible answers. This is to prevent the need of a function converting data inputted through a text box etc. to one format.

Upon submitting the questionnaire the JavaScript function ‘bigTest()’ is called to ensure a valid answer was selected for each question.

```
var e=document.forms["survey"]["gender"].value;
if (e="unselected") {
    alert("Please select a valid answer for question 1. If you would rather not provide an answer please select ‘Rather not specify’");
    return false;
}
```

Figure 9, Extract from ‘bigTest()’ function

Participants cannot proceed to the next section of the experiment until all questions have been answered either with a relevant value, or selecting the ‘Rather not specify’ option.
Should an attempt be made to submit the questionnaire with an answer value missing, ‘bigTest()’ will return a ‘false’ value and a dialog box is presented to the user notifying them of the question they have missed and the option of selecting ‘Rather not specify’. The requirement to answer each question either with a usable value or as a non disclosure was to encourage participants’ engagement from reading each individual question. This is in order to increase the accuracy of the individuals input and subsequent profiling, as well as in the overall experiment results.

```php
$gender = $_POST["gender"]; $age = $_POST["age"]; $income = $_POST["income"]; 
```

**Figure 11, Storing Demographic Information**

### 4.4 Calculating Profile Scores

Although the answers to the demographic questions are stored directly in the database, the psychographic information is analysed through a specific ‘Profiling Process’.
The answers to the independent questions in the questionnaire involve an addition to the running total of specific membership scores. In contrast, the answers to the dependent questions impact a profile score based on a set of preconditions.

```php
//QUESTION4 -image
$answer_q1 = $POST['q1'];
    if ($answer_q1=="a"){
        $adventurer_score = $adventurer_score+2;
        $ansA++;
    }
    if($answer_q1=="b"){
        $plannedAdventurer_score = $plannedAdventurer_score+2;
        $ansA++;
    }
    if($answer_q1=="c"){
        $variedTraveller_score = $variedTraveller_score+2;
        $ansA++;
    }
```

*Figure 12, Profiling Independent Questions*
The variables ‘$ansA’ and ‘$ansB’ are used to keep track of how many questions of the independent and dependent set are answered with values other than ‘rather not specify’.

‘$ansA’ counts all those questions which added ‘2’ to the running membership scores. ‘$ansB’ counts the total number of questions answered where the membership scores were increase by ‘4’. This facilitates the correct calculation of membership as a percentage as the total number of points attributed to the participants’ membership scores to all five profile groups is known.

The scores for each profile are subsequently put in descending order, with the highest scoring profile being stored as ‘profileA’, and on down to the lowest scoring profile as ‘profileE’.

**Figure 13, Profiling Dependent Questions**
Once the calculations are finished, the relevant scores are posted to the ‘onlineUsers’ table in the database alongside the demographic information provided by the participant.

![Figure 14, ‘onlineUsers’ Table]

### 4.5 Employing Profile Scores

Each webpage individually assesses the current participants ‘profileA’, ‘profileB’ and ‘profileD’ values. Each of the five segments, ‘Explorer’, ‘Adventurer’ and so on, each have two images to be presented to participants with relevant profile values.

Showing the image related to the participants ‘profileD’ is purely experimental in nature. Doing so facilitates assessing if recall of images is correlated to the level of interest they are to the user.

As images are presented on screen, the system communicates with the database to record what images are shown to each user. This information is then used to analyse the successful recall ability of each participant in co-ordination with part three of the experiment, the survey.
4.6 Other components

A ‘leave now’ button links directly to the ‘log out’ page where the participant’s session is ended. This button is to provide a way for users to exit the system at any point and can be found on every page within the experiment. This is to follow the ethical guidelines laid out by the School of Computer Science and Statistics.

4.6 Conclusion

In developing the online simulation environment, the ease of use of the system by participants was important. The development of functions such as those which check user input in the questionnaire, ‘bigTest()’ are to ensure as many valid responses were submitted as possible. The profiling system takes into consideration the different types of information provided by the user and is transferable to the real environment.
**Chapter 5 Evaluation**

*This chapter presents an overview of the results from the online experiment*

**5.1 Introduction**

For the analysis of the experiment results participants were assessed based on their profileA value, i.e. each participant was a member of one profile group, that which they had the highest membership score. The reason for this is to analyse the impact of profiling in this manner, it is still upheld that consumers can hold membership to multiple segments simultaneously.

**5.2 Assessing Composition of Segments**

An analysis of the composition of each profile group was carried out through the ‘profilesInfo.php’ page, accessible only to the user: ‘ADMIN’. This page correlated all the demographic information of participants and grouped them according to the ‘profileA’ value. The collective demographic values were subsequently stored in the ‘composition’ table in the database to highlight any trends of membership across demographic segments [Appendix 9].
5.3 Analysis of the Composition of Profiles

![Profile Memberships](image)

**Figure 17, Percentage of Participants with ProfileA Values in Each Group**

In examining the relevance of Plogs’ claim that demographics do not align with psychographic profiling; the gender, income bands and age groups of the participants of each segment were assessed.

It was determined that no trend amongst income level nor age group emerged from those participants in the experiment [Appendix 9] as both were erratically dispersed across all five of the segments. This supports Plogs’ claim of no dependence of ‘venturesomeness’ on income level, and further suggesting a lack of dependence between ‘venturesomeness’ and age profile.

It was observed however that females are most likely to be a member of the more dependable segments, namely ‘Varied Traveller’ and ‘Old Favourite’. In contrast to this, membership of males was dispersed erratically. A link therefore between gender and
segment membership may be present, however the results in this experiment are not conclusive in either supporting or disregarding this claim.

![Figure 18, Gender Composition of Each Profile](image)

5.4 Analysis of Personalisation Method

A negative correlation value of -5.39 was identified between the average level of interest in an image group and the recall of these images across the five segments [Appendix 10].

Although the interest scores presented by participants do not align with their segment profile, examining the values entered for likelihood to partake in the activities or visit the locations shown in the imagery, highlights a possible reasoning for this.
<table>
<thead>
<tr>
<th>Image Group</th>
<th>Explorer</th>
<th>Adventurer</th>
<th>Planned Adventurer</th>
<th>Varied Traveller</th>
<th>Old Favourite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explorer</td>
<td>5</td>
<td>6.33</td>
<td>1</td>
<td>4.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Adventurer</td>
<td>5</td>
<td>6.33</td>
<td>1</td>
<td>4.3</td>
<td>1.23</td>
</tr>
<tr>
<td>Planned Adventurer</td>
<td>5</td>
<td>6.33</td>
<td>1</td>
<td>4.3</td>
<td>1.23</td>
</tr>
<tr>
<td>Varied Traveller</td>
<td>5</td>
<td>6.33</td>
<td>1</td>
<td>4.3</td>
<td>1.23</td>
</tr>
<tr>
<td>Old Favourite</td>
<td>5</td>
<td>6.33</td>
<td>1</td>
<td>4.9</td>
<td>1.23</td>
</tr>
</tbody>
</table>

*Figure 19, Average Interest Scores of Each Segment to Each Group of Images*

The alignment of these figures presents the possibility that the specific images sourced to align mostly with the ‘Adventurer’ segment. Consistent scores across the entire group of images are not expected, especially not so uniformly amongst such a varied cohort. This leads to the conclusion that the selection of the specific images did not align fully with each segments.

### 5.5 Conclusion

The analysis of the composition of the profile segments upheld the work of Plog and in general provides results in-line with those anticipated before the experiment was carried out. The possibility of gender aligning to venturesomeness though does emerge from this data set; however, this cannot be conclusive.

Furthermore, the unforeseen negative correlation between the level of interest in the image groups and the recall of same, as well as the insignificant recall of ‘own group’ images may be deeper rooted in the images specifically chosen for this experiment than the personalisation method employed.
Chapter 6 Conclusions

This chapter will summarise the project and its results. Future works and further research is also outlined.

6.1 Research Objective

The primary objective of this project is to better align the activities within the online marketing environment with both the academic literature on the role of businesses online, as well as with practices of personalisation of online experiences to users based on their interests, needs and preferences.

This objective is fulfilled by aligning the aims of traditional marketing segmentation to the activities of an online marketing campaign, within a specific industry. Further to this, a psychographic segmentation model was developed that can be adapted to weight different user behaviour according to the relevant decision journey, related to either the product, or an alternative industry to that studied in this project.

6.2 Future Works

The idea of the explorer as an ‘influencer’ was not fully explored in this project. Analysis of online behaviour rather than through collection of user input values would facilitate an analysis of the level to which an individual promotes an organisation or product to their social circle. This could prove fruitful in further studies of personalisation of advertising content, not just to align with the needs of users, but to ensure that promotional activities reach as many consumers, to whom they relate as possible.

Sourcing images from the Tourism Ireland website attempted to align the material with the industry studied. Future work may benefit from the inclusion of actual online advertising, either sourced again from Tourism Ireland or a similar organisation.

Given the broad range of data collected throughout the online experiment, analysis of the results could include analysis across demographic factors as well as user behaviour within the experiment environment.
References


20. World Travel and Tourism Council Website, Annual Review,

Appendix

1. Ethical Application Submitted to Research Ethics, School Of Computer Science and Statistics

1.1 Email

Hi,

Please find attached the summary of my project. As this survey will be online I have included the links below for each page:

Information sheet
www.fyp9.com/successfulRegistration.php

Consent Form

Survey for profiling:
www.fyp9.com/questionnaire.php

Consent for viewing:
www.fyp9.com/content.php

final questionnaire:

Kind Regards,
Aisling Cowzer

1.2 Outline of Project Proposal

1. Title of project: Analysing the impact of adapting online advertising content according to user behaviour and profile groups, within the domain of the tourism market.

2. Purpose of project including academic rationale

Aim of this project is to align the academic work of Plog (2002) who identified motivations to travel in groups of ‘venturesomeness’ with current trends in the market of personalising online advertising to each user. As well as this the project will incorporate analysis of user behaviour in relation to these advertisements, e.g. click-through rate, to identify a possible correlation between improved click-through rates with certain advertising content from profile group to group.

3. Brief description of methods and measurements to be used

A website built by the student will be visited by respondents which will involve the completing a short survey which will form the basis of their profiling. The respondent will not be aware of the level of belongingness they have to each profile group and all data stored will be anonymous. Based on the users’ belongingness to each group, particular advertising content will be placed on the internal webpages viewed by the respondent. The users activities will be monitored from page to page and belongingness levels will subsequently be updated. A short questionnaire will follow to
determine the impact of adapting the advertising content from profile group to profile group and to form a basis for statistical analysis. Again, this information will be stored anonymously.

There are a total of five profile groups, with potential belongingness levels ranging from zero to one hundred. The users will have created a username to facilitate storing of the information, it will be advised however that this username has no reference to their actual name, and is of their choice.

The user behaviour will only be recorded while they are viewing the pages of the site created by the student. No further data will be collected once the user leaves the site. Behaviour recorded will include:

- Images viewed
- Pages Viewed
- Frequency of views

4. Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants

Participants will be recruited through email. It is proposed to request participation from fellow students within Trinity College, all over the age of 18. It will also be required to request respondents from an older age group; this shall be done through personal contacts. Participants of both genders will be required. Exclusion criteria will be of those below the age of 18.

The number of participants required must fulfil an acceptable belongingness across the five profile groups. As such a group of ten people per profile is preferable, with a mix of genders accordingly across the group. Therefore the minimum number of respondents required to provide a basis of analysis is fifty.

5. Debriefing arrangements

The survey begins on completion of creation of a username with the site, this then leads to the user viewing a number of webpages, when data is still being collected. As this process can vary in length from user to user, there will be a ‘Finish Now’ link at the top of each web page. On clicking this link the users session with the site will cease and no more data will be stored. The participant will be notified of this as seen below;

Thank you for participating in FYP9.com.
The information you have provided to us, and any data recorded will remain anonymous.
You have now exited the process and no further information or data will be recorded.
Should you have any further questions or queries about the process please do not hesitate to contact: cowzera@tcd.ie

6. A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them

The idea of analysing user behaviour poses multiple issues, including that of privacy. The set-up of an opt-in from participants to the process has been adopted for transparency that the activities they carry out within fyp9.com will be noted and analysed. Fyp9.com will not have any access to other online activities of the participants outside the site.

No person under 18 years of age will be permitted to take part in the project.
Data stored will be done so anonymously. This is to assure the participant that any information gathered will not be a risk to their own digital and personal identity.

7. Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.

1.3 Parts A – E of Application Form

SCSS Research Ethics Application Form September 2011
School of Computer Science and Statistics
Research Ethical Application Form

Part A
Project Title: Adapting the content and location of tourism advertising on webpages based on user profiles and behaviour
Name of Lead Researcher (student in case of project work): Aisling Cowzer
Name of Supervisor: Dr. Alexander O’Connor
TCD E-mail: cowzer@tcd.ie Contact Tel No.: 0857825757
Course Name and Code (if applicable) : BA(Mod) Business & Computing
Estimated start date of survey/research: 15-03-13

I confirm that I will (where relevant):
Familiarize myself with the Data Protection Act and the College Good Research Practice guidelines

Tell participants that any recordings, e.g. audio/video/photographs, will not be identifiable unless prior written permission has been given. I will obtain permission for specific reuse (in papers, talks, etc.)
Provide participants with an information sheet (or web-page for web-based experiments) that describes the main procedures (a copy of the information sheet must be included with this application)
Obtain informed consent for participation (a copy of the informed consent form must be included with this application)
Should the research be observational, ask participants for their consent to be observed
Tell participants that their participation is voluntary
Tell participants that they may withdraw at any time and for any reason without penalty
Give participants the option of omitting questions they do not wish to answer if a questionnaire is used
Tell participants that their data will be treated with full confidentiality and that, if published, it will not be identified as theirs
On request, debrief participants at the end of their participation (i.e. give them a brief explanation of the study)
Verify that participants are 18 years or older and competent to supply consent.
If the study involves participants viewing video displays then I will verify that they understand that if they or anyone in their family has a history of epilepsy then the participant is proceeding at their own risk
Declare any potential conflict of interest to participants.
Inform participants that in the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.
Act in accordance with the information provided (i.e. if I tell participants I will not do something, then I will not do
it).
Signed: ......Aisling Cowzer................................................................. Date: 07-01-13
..........................................................
Lead Researcher/student in case of project work

**Part B**

Please answer the following questions. Yes/No

Has this research application or any application of a similar nature connected to this research project been refused ethical approval by another review committee of the College (or at the institutions of any collaborators)? **No**

Will your project involve photographing participants or electronic audio or video recordings? **No**

Will your project deliberately involve misleading participants in any way? **No**

Is there a risk of participants experiencing either physical or psychological distress or discomfort? **NO**

If yes, give details on a separate sheet and state what you will tell them to do if they should experience any such problems (e.g. who they can contact for help).

Does your study involve any of the following? Children (under 18 years of age) **No**

People with intellectual or communication difficulties **No**

Patients **No**

SCSS Research Ethics Application Form September 2011

School of Computer Science and Statistics

Research Ethical Application Form

Details of the Research Project Proposal must be submitted as a separate document to include the following information:

1. Title of project
2. Purpose of project including academic rationale
3. Brief description of methods and measurements to be used
4. Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants
5. Debriefing arrangements
6. A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them
7. Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.

**Part C**

I confirm that the materials I have submitted provided a complete and accurate account of the research I propose to conduct in this context, including my assessment of the ethical ramifications.

Signed: ........Aisling Cowzer......................................................... Date: 07/03/2013

Lead Researcher/student in case of project work

There is an obligation on the lead researcher to bring to the attention of the SCSS Research Ethics Committee any issues with ethical implications not clearly covered above.

**Part D**

If external ethical approval has been received, please complete below. **Not received**
External ethical approval has been received and no further ethical approval is required from the School’s Research Ethical Committee. I have attached a copy of the external ethical approval for the School’s Research Unit.

Signed: ................................................................. Date: ...............................................

Lead Researcher/student in case of project work

Part E

If the research is proposed by an undergraduate or postgraduate student, please have the below section completed. I confirm, as an academic supervisor of this proposed research that the documents at hand are complete (i.e. each item on the submission checklist is accounted for) and are in a form that is adequate for review by the SCSS Research Ethics Committee.

Signed: ................................................................. Date: ...............................................

Supervisor

Completed application forms together with supporting documentation should be submitted electronically to research-ethics@scss.tcd.ie Please use TCD e-mail addresses only. When your application has been reviewed and approved by the Ethics committee hardcopies with original signatures should be submitted to the School of Computer Science & Statistics, Room F37, O’Reilly Institute, Trinity College, Dublin 2.

2 DigiWeb Hosting

Welcome to Digiweb hosting.

Support: http://hosting.digiweb.ie/support/

Website: http://hosting.digiweb.ie

Dear hosting customer,

Thank you for choosing Digiweb for your hosting needs, we aim to provide a professional service at all times and appreciate your business!

Your new account (Student Hosting) has now been set up and below you can find all the information needed to manage your account.

Please note that it can take from 24 - 48 hours for your site to become fully accessible on the Internet. If you register for a .ie domain name this can in rare cases take a little longer than 48 hours due to the registration process and documentation required. If after 48 hours from the date on this e-mail your domain is still not available, please send an e-mail to us here at hosting@digiweb.ie stating your domain name and we will resolve the issue as quickly as possible.

If you have any other problems or queries about your hosting account, please contact our support department here on this address: hosting@digiweb.ie or use our comprehensive Help pages located here: http://hosting.digiweb.ie/docs/hpshere/usaguide

You can view our support arrangements at the following URL: http://hosting.digiweb.ie/support/

Please keep this mail for your own reference as our support department may ask you to refer to it in future communications.
3 Survey Participants

<table>
<thead>
<tr>
<th></th>
<th>Questionnaire</th>
<th>Content Browsing</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
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<td>52</td>
<td>46</td>
</tr>
<tr>
<td>Incomplete</td>
<td>16</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

4 Psychographic Profiles

<table>
<thead>
<tr>
<th>(i) Explorer</th>
<th>(ii) Adventurer</th>
<th>(iii) Planned Adventure</th>
<th>(iv) Variety Traveller</th>
<th>(v) Old-favourite</th>
</tr>
</thead>
<tbody>
<tr>
<td>The truly Venturesome.</td>
<td>Explore new places, not afraid to travel alone, self-confident.</td>
<td>Eager to try new places but does return to places of old from time to time.</td>
<td>Will travel to non-typical locations on advice of friends who have been there.</td>
<td>Makes the same trip annually, perhaps more regularly.</td>
</tr>
<tr>
<td>Not concerned with standards of living when away.</td>
<td>More likely to pre-book perhaps even just a hostel.</td>
<td>Will plan entire trip before embarking on travel. Will do most of the work themselves as opposed to travel agents.</td>
<td>Gets a package deal from travel agents.</td>
<td>Gets a package deal from travel agents.</td>
</tr>
<tr>
<td>Likely to spend more on travelling to location than spending in location.</td>
<td>Likely to spend more on travelling to location than spending in location.</td>
<td>Will follow hints and tips on best deals from friends who have been there before.</td>
<td>Likely to get an all-inclusive deal.</td>
<td>Spend more when you get there, likely to know where is good to eat.</td>
</tr>
<tr>
<td>Sleep cheap – eat cheap</td>
<td>Sleep cheap – eat nice</td>
<td>Sleep cheap – eat well</td>
<td>Sleep and eat well</td>
<td>Sleep well – eat well</td>
</tr>
<tr>
<td>Looking to explore and gain new experiences</td>
<td>Looking to experience – ‘authentic culture’</td>
<td>Looking to travel to a new place in safety.</td>
<td>Looking to travel to a new location in comfort.</td>
<td>Looking to relax/chill out and returning to location.</td>
</tr>
</tbody>
</table>

5 Online Questionnaire

www.fyp9.com/questionnaire.php
6 ‘onlineUsers’ Table in the Database

<table>
<thead>
<tr>
<th>Field</th>
<th>Type</th>
<th>Collation</th>
<th>Attributes</th>
<th>Null</th>
<th>Default</th>
</tr>
</thead>
<tbody>
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<td>NULL</td>
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<tr>
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<td></td>
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<td>gender</td>
<td>text</td>
<td>utf8_general_ci</td>
<td>Yes</td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>text</td>
<td>utf8_general_ci</td>
<td>Yes</td>
<td>NULL</td>
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</tr>
<tr>
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<td>text</td>
<td>utf8_general_ci</td>
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<td>NULL</td>
<td></td>
</tr>
<tr>
<td>lastUpdate</td>
<td>timestamp</td>
<td></td>
<td>Yes</td>
<td>CURRENT_TIMESTAMP</td>
<td></td>
</tr>
<tr>
<td>Explorer</td>
<td>decimal(11,0)</td>
<td></td>
<td>Yes</td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>Adventurer</td>
<td>decimal(11,0)</td>
<td></td>
<td>Yes</td>
<td>NULL</td>
<td></td>
</tr>
<tr>
<td>PlannedAdventurer</td>
<td>decimal(11,0)</td>
<td></td>
<td>Yes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>VariedTraveller</td>
<td>decimal(11,0)</td>
<td></td>
<td>Yes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>OldFavourite</td>
<td>decimal(11,0)</td>
<td></td>
<td>Yes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>profileA</td>
<td>text</td>
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<td>NULL</td>
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<td>Yes</td>
<td>NULL</td>
<td></td>
</tr>
</tbody>
</table>

7 Images used for Personalised Content

Source: Tourism Ireland Website, Downloaded March 2013.

7.1 Explorer Images
7.2 Adventurer Images

7.3 Planned Adventurer Images

7.4 Varied Traveller Images
7.5 Old Favourite Images

8 Survey Question

Was this image displayed to you on any of the previous pages?
- Yes
- No
- Unsure
- Rather not say

On a scale of 1 - 10 (1 being not a match, 10 being a very close/perfect match) how closely is this image aligned with your personal interests?
- 1  2  3  4  5  6  7  8  9  10
- Rather not say

On a scale of 1 - 10 (1 being not likely, 10 being very likely) how likely would you be to partake in the activity in this picture within the next 6 months?
- 1  2  3  4  5  6  7  8  9  10
- Rather not say
## 9 ‘composition’ Table

<table>
<thead>
<tr>
<th>Profile</th>
<th>explorer</th>
<th>adventurer</th>
<th>plannedAdventurer</th>
<th>variedTraveller</th>
<th>oldFavourite</th>
<th>population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
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<td>1</td>
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<td>10</td>
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<td>0</td>
<td>2</td>
<td>3</td>
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<tr>
<td>opinion2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>opinion3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

## 10 Correlation between interest in images and recall score

<table>
<thead>
<tr>
<th>Image group</th>
<th>Acurate Recall %</th>
<th>Average Interest</th>
<th>PlainedAdventurer</th>
<th>Varied Traveller</th>
<th>Old Favour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explorer</td>
<td>71.43</td>
<td>6.21</td>
<td>34.62</td>
<td>55.77</td>
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</tr>
<tr>
<td>Adventurer</td>
<td>0.57</td>
<td>5.79</td>
<td>46.15</td>
<td>45.15</td>
<td></td>
</tr>
<tr>
<td>PlannedAdventurer</td>
<td>0.71</td>
<td>6.80</td>
<td>50</td>
<td>46.15</td>
<td></td>
</tr>
<tr>
<td>Varied Traveller</td>
<td>0.57</td>
<td>8.50</td>
<td>42.31</td>
<td>46.15</td>
<td></td>
</tr>
<tr>
<td>Old Favourite</td>
<td>0.50</td>
<td>7.40</td>
<td>46.15</td>
<td>48.08</td>
<td></td>
</tr>
</tbody>
</table>

- Correlation: -0.38
- Average: 0.5385

Correlation between average interest score for each image group given by those in each profile, with the successful recall of images by the same participants.