An investigation into whether 18-30 year olds view the Dark Web as relevant - A perspective of cyber privacy

A dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Science (Honours) in Business Information Systems

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Declaration

I hereby declare that this dissertation entitled: An investigation if 18-30 year olds view the Dark Web as relevant, regarding their internet habits focusing on cyber privacy. is entirely my own work, and it has never been submitted nor is it currently being submitted for any other degree.

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Summary

This study aims to investigate whether 18-30 year olds view the Dark Web as relevant, having a focus on their cyber security, and to produce recommendations to Dark Web users and TOR developers in maintaining or making it relevant. The continual advancement in technology and information warfare has created a need for individuals to be able to use the Web in anonymity and privately, with the knowledge that their information is secure. As this evolution of computing and information continues, if the use of more secure and socially deemed seedy tools like the Dark Web the way forward? Data for the study was conducted via a questionnaire, and semi-structured interviews were also undertaken. Ultimately, a conclusion was derived from this project which suggests that the Dark Web is seen as relevant but not by a clear majority, but it is a vital tool in the efforts of information freedom and privacy for internet users.
Acknowledgements

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Glossary of Terms

TOR – “The Onion Router” is the tool that allows the users to access the Dark Web allows access to the .onion web domains.

IP Address – The internet protocol address is the unique address that identifies any device that is accessing the internet. It allows a system or device to be recognised by other systems that are connected by IP.

VPN – “A virtual private network is “tunnelled” through a wide area network WAN such as the Internet. This means the network does not have to be located in one physical location like a LAN.” (TechTerms, 2008)

Deep Web – The Deep Web is the part of the Internet that is not able to be discovered by the means of the standard search engines e.g. Google.

Dark Web – The Dark Web is part of the Deep Web, it is only accessible by using special software e.g. TOR, it allows users and website hosts/creators to remain anonymous and mostly untraceable.

Hidden Wiki – A webpage that lists the .onion webpages that people can use to access the Dark Web, contains lots of dead links but also still working Dark Web pages.
CHAPTER 1: Introduction

1.0 Introduction

This chapter presents a brief background and context of the topic which is under investigation – “An investigation into whether 18-30 year olds view the Dark Web as relevant - A perspective of cyber privacy”. The research problem is identified and the aims and objectives are presented.

1.1 Background

“For some the ‘dark net’ has come to mean the encrypted word of tor hidden services, where users cannot be traced, and cannot be identified.” (Bartlett, 2015) The Dark Web, also known as the Dark Net, which is sometimes confused with the name of Deep Web, is in the simplest terms, a collection of web pages that are not accessible via the usual internet. The term deep web was put into fruition in 2001 by computer scientist Michael K. Berman.

There are three main widely used Dark Webs:

- TOR
- I2P
- Freenet

The research will be primarily focused on TOR which is the largest. Of course, there are other darknets out there, but they may be extremely exclusive for select individuals.

Technology and more importantly the internet are becoming ever more present in everyday life with 78% of adults aged 16-24 accessing the internet daily (Office of National Statistics, 2015) the idea and issue of digital, and online security is becoming more important and relevant for people. With bills like the Investigatory Powers Act 2016 that forces all internet service providers within the UK to store all of its customer’s internet browsing history for 12 months (Shaw, 2016) is the UK government being to become too intrusive on its citizens? With the United Nations privacy, chief stating that the United Kingdom is setting a bad example on their surveillance. (Cannataci, 2016)

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1.1 Research Problem

The mainstream internet is becoming less of an anonymous place, is it time for ‘regular’ internet users to switch to using tools like the dark web? And as privacy has always been an issue for a civilised society government, trying to find the right balance between having knowledge on its state, and over surveillance on its citizens is becoming a bigger problem, especially for its citizens, and with the internet being the biggest information hub is anything private on cyberspace anymore. 68% of internet users believe current laws are not good enough in protecting their privacy online, and only 24% believe that the current laws are adequate in the protection they provide (Rainie et al., 2013).

Data has a significant value in today’s society especially in information warfare. With personal data being more prevalent on the web, governments and other parties have started to see the usefulness of collecting and storing individual’s data. Using a tool like the Dark Web could be the solution to this problem, which will be investigated during the period of this project.

1.2 Aim and Objectives

This research project concerns the investigation into the relevance of the Dark Web to 18-30 year olds, mostly regarding their cyber privacy. The research aim and objectives are set out below:

1.2.1 Aim

The aim of this research is to investigate if 18-30 year olds recognise if the Dark Web is a relevant tool in today’s technological age, focusing on the use of it based on their cyber privacy.

1.2.2 Objectives

The objectives below have been set up to achieve the above aim of the project:

- To conduct a literature review on the subject area
- To design and implement a questionnaire on my target sample
To analyse the data collected from the questionnaires to identify if the dark web is seen as relevant

Interview key sample members, to evaluate the benefits of the dark web as opposed to the internet

To conclude and produce a closing statement on if the Dark Web is still relevant, along with a list of recommendations on how to keep it relevant

1.3 Format of Dissertation

Chapter 1 introduces the research projects topic outline a brief background and the research problem, the aim and objectives of the project are also outlined.

Chapter 2 outlines a literature review on the research topic, going into details of the emblems that make up the topic.

Chapter 3 goes into the methodology and research design of the research project Methodology, the chapter describes the research approach, and research philosophy, and goes into detail of the epistemology of the study. The chapter also goes into detail on the structure and design of the questionnaire with the use of closed and opened questions.

Chapter 4 details the results of the primary research, showing where necessary the data in graphs for an easier display of the information. The chapter is split into two sections: the open question results and the closed question results.

Chapter 5 contains the main discussion of the research project, here the results from the primary, and the secondary research will be discussed and applied to the research problem.

Chapter 6 will conclude and summarise the finding and discussion chapters, and also provides some recommendations on the research problem.

CHAPTER 2: Literature Review
2.0 Literature Review

Due to the subject matter of the research project, the conducted literature review can be seen as short compared to one conducted on another topic, this is due to the small supply of academic literature as by the time a journal or book is published it is usually outdated in some aspect as the technological area is subject to rapid expansion and change.

The internet has become an important part of everyday life and an important aspect of individual’s social lives, where it is used for different purposes. In the age category of 16-24 year olds 99.2% of them are actively using the internet daily, as well as the age bracket of 25-34, having an 88% activity rate on the internet (Office of national statistics, 2016), and in 2013 it was reported that 21 million households (83%) in the United Kingdom had access to the internet, and is most likely considerably higher now.

2.1 History of the Dark Web and TOR

Tim Berners- Lee has been hailed as the father of the internet (Bellins, 2014), due to his creation of his project “Distributed Information Management system” where the ideas generated about structure and his innovation were included to create something similar to the internet we see today. One can make the argument that, his creation could be classed as Dark Web worthy as it fits the criteria, at the time it was a private collection of information that could not be accessed by a web surface crawler.

Freenet the first large popular Dark Web was launched in March 2000 by Ian Clarke, battling the issue of pirating copyrighted material, “Freenet is a near-perfect anarchy” (Clarke, 2000). Such statements may influence the way that ‘normal’ internet users perceive it making them wary of it and anything relating to the Dark Web. Moreover, Clarke then states “I have two words for ...companies (companies attempting to stop file sharing) Give Up”. As being one of the first mainstream methods to access and thus being the first mainstream image for the Dark Web Clarke does not send a reassuring statement about this side of the internet for the public, it is no surprise that 1 in 7 people want the Dark Web to shut down. (Greenberg, 2016)
TOR short for “The Onion Router” came into fruition in 2002 by the U.S. Naval Research Laboratory, which aim was protect the identity of any American operative or dissidents in countries like China, it did this by concealing the location and IP address of the user. Now TOR is adopted by regular users with over 1,500,000 users (TOR, 2017) daily connecting to the TOR service. But out of these users only 2,000 – 4,500 are UK based as shown in Figure 2.1

![Bridge users from the United Kingdom](image)

Figure 2.1 Graph on users of TOR based in the UK (TOR, 2017)

These users could not be using it for the .Onion service therefore one must take into consideration, that the user is only using TOR for its ability of being a useful VPN (Virtual Privat Network) tool, and not for its access of the Dark Web. There are over a minimum of 47,000(TOR, 2017) unique .onion addresses which can only be accessed with the TOR software, but this number fluctuates during a month’s period and can hit a high of 120,000.

### 2.2 Dark Web V Deep Web

Commonly misrepresented and quoted by mainstream media as being 90% of the internet the Dark Web is a deeper layer of the internet. The misconception with the dark web is that of the notion of calling it the Deep web, although the dark web is part of the deep web the deep web is not entirely the dark web. “The Deep Web refers to content hidden being HTML forms. In order to get to such content, a user has to perform a form submission with valid input values.” (Madhavan et al., 2009, p1). A simple explanation of the deep web is any
information or data on the web that is inaccessible by web search engines, for example making your Facebook page private would could as content on the deep web as it would be inaccessible by any search engine.

![Figure 2.2 visualisation of deep web and Dark Web (Chandler, 2015)](image)

Figure 2.2 displays an informative visualisation of the different “layers” of the web, this helps show a clear understanding just how little of web is actually used by web users.

### 2.3 Cyber Security and Cyber Privacy

Importantly the explanation of the meaning of privacy and obviously cyber privacy should be stated “Warren and Brandes famously described privacy as ‘the right to be left alone’”. (Edwards and Waelde, 2010, p548). Applying this to cyber privacy would this mean that the UK government are in breach of an individual’s privacy with their investigatory powers act. Under common law each citizen has the right to privacy and they can keep their personal information private, other individuals do not have a right to interfere with this personal...
information, or to bring any of this information to the public. With the government forcing Internet Service Providers (ISP) to keep their customers browsing data for up to a year, which can be requested by over 40 different UK agencies (Griffin, 2016). Furthermore, with the UK governments past examples of data breaches where in the period of 2014-2015 personal data held by the government was breached nearly 9,000 times but only notified the information commissioner 14 times (The Guardian, 2016) is it time to move onto new measures where the government cannot access your cyber habits.

In November 2011, the United Kingdom published its Cyber Security Strategy stating, “Our vision is for the UK in 2015 to derive huge economic and social value from a vibrant, resilient and secure cyberspace, where our actions, guided by our core values of liberty, fairness, transparency and the rule of law, enhance prosperity, national security and a strong society” (United Kingdom Government, 2011). The report considers what future goals the UK government wants in aspects of cybersecurity mentioning throughout that liberties of UK citizens take a priority, this paper completely contradicts the current standpoint the government has taken today.

Andrew Liaropoulos reported on Cyber-security: A human centric approach. Looks at the diminishing internet freedom, anonymity and data protection is currently under attack, and what the challenges of establishing a governance regime for cyberspace that can successfully address human rights norms and standards. The report gives an insight on the issue of “the correlation between cyber-security and national security. When addressing the cyber-security needs at the national level - national cyber security - approaches diverge in each state” (Ventre, 2012).

The study will investigate if the Dark Web is seen as relevant and useful, and if the audience consider using it and if not why.

CHAPTER 3: Research Methods

3.0 Research Method
This chapter will present the research design, philosophy and methods that were used for the research project titled: An investigation into whether 18-30 year olds view the Dark Web as relevant – A perspective of cyber privacy. The chapter sets out clearly the research aim and objectives and provides adequate rationale to support the adopted research approach. The analysis of the relevance of the Dark Web will focus on and incorporate the Saunders et al., (2015) research process onion (figure 3.1), which gives the study a set of guidelines to follow which can help ensure the success of the project. Implementing the research onion in a research project, will help to increase the accuracy when selecting a research strategy, as it provides the researcher a set of stages to follow during the development of the research methodology.

**Figure 3.1: Saunders et al. research process ‘Onion’**

The researcher can explore the layers of the research onion, it allows them to reach the central point of the onion which contains the selection of suitable data collection techniques for the investigation stage of the research project.
3.1 Research Design

When planning the initial project one of the important, possibly most weighty decision excluding the topic, is which method of collecting information is the most appropriate. “All the topics need to be interrelated so that they provide a cohesive picture of the entire proposed project” (Creswell, 2014). Crotty (1988) ideas have established the groundwork for the framework of a research proposal, in setting up a research proposal 4 questions should be considered:

1. What epistemology, the theory of knowledge that is embedded into the theoretical perspective, e.g. objectivism, subjectivism?
2. What theoretical perspective, or philosophical stance that lies behind the methodology in question?
3. What methodology governs the choice and use of methods?
4. What methods are proposed to be used? (Creswell, 2014)

The author identifies the epistemology of this research project as a realism one, the phenomena of the subject can be observable and will generate credible data and facts, this entomology focuses on causality and law-like generalisations, reducing the topics phenomena to the simplest elements (Saunders et al., 2012). The researcher when conducting their study, must be able to balance ethical issues when gathering information from diverse sources, such as observations, questionnaires, interviews etc. “researchers need to anticipate the ethical issues that may arise during their studies...writing about these issues is required for making an argument for the study”. (Cresswell, 2014)

Primary research for this project used methods such as online questionnaires that were available through social media, and semi structured interviews. As well as primary research, additional secondary research was also collected, which was based on collecting information from past published novels, journals and previous studies to aid the author in achieving the stated out aim and objective of this project. A more in depth justification of primary research gathering is described in a later section in this chapter below.

3.2 Research Approach and Philosophy
A research philosophy is an overarching term, which examines the development of knowledge and the nature of it. An issue with research philosophy’s is there is no uniform definition of them, there has been cases where several studies have used different descriptions, categorisations and classifications of research paradigms and philosophies in relation to research methods with overlapping emphasis and meanings (Saunders et al., 2015; Mkansi and Asiamah, 2012).

Phenomenological research is where the researcher identifies the “essence” of human experiences concerning a phenomenon, as described by participants in a study” (Cresswell, 2008). Phenomenology was chosen as a research philosophy that is most suitable and relevant to the topic. With this research philosophy in mind the author deemed that is the most appropriate research philosophy to align the project on. To further expand on this, the Dark Web is a technological phenomenon that has occurred since the incarnation of the mainstream internet, the increase of popularity and media coverage the Dark Web has had an impact on the choice of the research philosophy. The chosen approach will help to identify internet user’s awareness of the Dark Web, and will check to see if they understand why the Dark Web is relevant.

Looking at Saunders et al. onion the layer that involves selecting a research approach, the two research approaches that it displays to consider are the inductive approach, and the deductive approach. Researchers can relate these approaches to their research philosophies, and by doing this can further define the research methodology.

3.2.1 Inductive

If the research project begins with the inductive approach, which involves the collection of data at the start of the investigation and then going on to developing the theories towards the end of the research because of the data collected (Crossman, 2014; Saunders et al., 2016) utilising the inductive approach can aid the researcher in easier adjustment of the direction of the research project, once the research has started.

The inductive approach is mostly referred to as a bottom up method, with the research starting with certain observations to detect patterns, once the data has been collected it is formulated at the end of the investigation to develop a hypothesis (Crossman, 2014). The inductive approach involves the researcher working with apprehension that no valuable
patterns in the data will materialise, which prevent a valid conclusion from being performed (Saunders et al. 2016). Ultimately the inductive approach involves no theory at the start of the investigation, and has the possibility of one evolving by the end of the research.

3.2.2 Deductive

The other approach is the deductive, which involves developing a theory and then subjecting it to extensive testing to either confirm or deny its validity (Collins, 2010; Saunders et al., 2016). The deductive approach can be seen as the preferred approach for a natural scientist, the reasoning being this is the way the investigation is, the researcher explores the relationships between the variables and attempts to explain why the results have turned out the way they have. A deductive research approach will contrast the inductive, as it will work from the top down, which is the reverse of the inductive research method. To conclude the inductive approach is used to research alternative explanations, which broaden the conclusions of an investigation, whereas the deductive approach aims to create links between variables in a research project.

3.3 Method of Research

For research projects, there are two distinct types of methods that can be selected to conduct for the study, they are quantitative and qualitative. These methods differ in how data is collected, and the decision of which method is used normally depends on the research philosophy and research topic. "the knowledge claims, the strategies and the method all contribute to a research approach that tends to me more quantitative, qualitative or mixed" (Cresswell, 2014) The method chosen by the author therefore must be suitable for their topic of research, and will help enable the research to achieve its aims and objectives.

“A qualitative approach is one in which the inquirer often makes knowledge claims based primarily on constructivist perspectives” (Cresswell, 2008) The aim for using a qualitative research approach is to be objective, with the projects conclusions to be based on previous research conducted by other studies (Greetham, 2014). Qualitative techniques are used to explore new topics and understanding of the human experience by making sense or interpreting phenomena in terms of the meanings people bring to them (Hoe and Hoare, 2012)
"A quantitative approach is one in which the investigator primarily uses postpositivist claims for developing knowledge" (Cresswell, 2008). Data collected is illustrated in complex approaches like statistics, mathematical models, the data is primarily represented in a numerical format, and is used to display relationships between certain variables and can measure the frequency of these relationships (Hoe and Hoare, 2012).

“A mixed methods approach is one in which the researcher tends to base knowledge claims on pragmatic grounds” (Cresswell, 2008). Cresswell et al. (2008) devised on four decisions that should go into select a mixed methods strategy of inquiry

1. what is the implementation sequence of the quantitative and qualitative data collection in the proposed study?
2. What priority will be given to the quantitative and qualitative data collection and analysis?
3. At what stage in the research project will the quantitative and qualitative data and finding be integrated?
4. Will an overall theoretical perspective be used in the study?

3.4 Participant Sample and Sampling Method

The study was based on the analysis of the knowledge and experiences of UK related to the Dark Web. Therefore, there were two main criteria for participants to be able to take part in the study, firstly the age of the individual, and secondly the ability to understand and fill out the questionnaire. These two factors were the inclusion criteria. The questionnaire was only available to participants who were over 18 and accepted that their data would be used in this research project. The studies main aim is to conduct a decision from the primary research if the target audience deems the Dark Web as relevant.

Distributing the questionnaire via social media, allowed the author to hit a larger sample and variety of the targeted convenience sample. Using social media was a faster and efficient way than other methods of distribution, and it was used to get a greater influence to achieve higher numbers of responses. Overall 47 responses were received, which was over the sample target for the project. The data from the questionnaires was collated and analysed, which can be found in chapters 4 & 5.
3.5 Questionnaire

The author understood that because of the topic subject people may be more apprehensive in filling out a questionnaire, which is why anonymity was something the author highlighted when distributing the questionnaire. Ensuring the sensitivity of the topic encouraged the author to use the method of anonymous questionnaires as the main method for collecting primary data. Veal and Ticehurst (2008) state that anonymity is an advantage when collecting primary data from participants, as it allows them to express their opinions about sensitive topics. Having relevant data is a crucial factor of the validity of the research project, having more data and therefore information generated will give the author and reader a more accurate view of the problem.

The questionnaire was created on the recommended site by Cardiff Metropolitan University called Quadratics. The Quadratics website allows the easy creation and management of a questionnaire, with the ability to make corrections in real time. As well as this questionnaire management, it also has a built-in reporting tool for the data collected, and lays out the responses in a simplistic yet effective manner. As well as this you can also do basic data analysis with the tools they provide, but they also allow you to download the data in a .exl file format to open in Microsoft Excel which can aid in easier and future data analysis. The Dark Web questionnaire consisted of 18 questions in a variety of both opened and closed questions.

3.6 Open and Closed Questions

The design of the questionnaire was based on the aim to analyse the targeted samples opinions on the Dark Web and its relevance. The main aim of the research is to identify key opinions on the Dark Web, looking at its relevance, technical knowledge and general knowledge and perception of the tool. These aims helped influence the design of the questionnaire and the structure to where open and closed questions were utilised. Using Saunders et al. (2009) advice, the questionnaire was designed in accordance to this, which meant the questionnaire had a clear and logical flow of questions, and the questions were worded and displayed in a way that was easy for the participant to answer.

The questionnaire was separated into three categories: consent (where the details about the project are stated and consent to use the data is obtained) demographic information and initial
information on their knowledge of the Dark Web (information like age, if they have used the Dark Web, if they know about the Dark Web etc.) and the last section is on participant’s opinions on statements on the Dark Web.

The second group of questions is based on open and closed questions, all open questions followed a closed question to break up the monotonousness of the survey but also to aid in the flow of the questionnaire.

3.7 Semi-Structured Interviews

One of the most common methods of data collection used in education and social sciences is the use of interviews. The research tool of interviewing is a subjective method which attempts to include the participant’s attitudes opinions and experiences, which the author will then attempt to interpretive these factors in analysis. An interview assumes that the participants are ‘experts’ of the topic that the interview is being conducted over and that is the reason as to why they were selected for the interview (Bell and Walters, 2010). The interview that was conducted in a semi-structured approach. This approach is intended to ensure that the same general areas of information are discussed and collected from each participant, but the interview still has an allowance of freedom, to gather more varying data from the participants.

3.8 Data Analysis

Data that was gathered from the primary research was analysed utilising the built-in reporting tool that was used to gather the information. Additionally, when seen as appropriate the data was also analysed in the Statistical Package for the Social Sciences (SPSS). Close ended questions answers were easily coded into categories, mostly numerical e.g. 1(NO); 2(yes), but other categories were used depending on the question.

Analysis of qualitative data from open ended questions responses were organised by similarity of the responses and then categorised (Veal and Ticehurst, 2005). In addition, where appropriate responses by participants were relevant and could aid in the discussion, were cited in the discussion chapter to help underpin and support the authors discussion.

3.9 Ethics statement
“In addition to conceptualizing the writing process for a project, researchers need to anticipate the ethical issues that may arise during their studies” (Cresswell, 2008). Lyon & Howard (2009) state that the structure of primary research must be conducted in a way that it is not harmful for the participant, it is the aim for the author to take into consideration the well-being of the participants and ethics of conducting a specific study.

Prior to the data collection stage ethics approval was applied for from the Ethics Committee of Cardiff School of Management (CSM) of Cardiff Metropolitan University an Approval was granted in December 2016 and data collection started towards the end of January 2017. (reference to appendix that includes the ethics.) Relevant documentation was given in support of the ethics, documents such as sample questionnaire, sample semi-structured interview question, and consent form. The Ethics Committee from Cardiff Metropolitan University reviewed the application, and at the beginning of December 2016, the ethical approval, and project ethic number was obtained.

CHAPTER 4: Results

4.0 Results

This chapter of the investigation will go over the results of the primary research that consisted of an online questionnaire. The findings presented are done by using the built-in tool by quadratics and aided by the software Statistical Package for Social Sciences (SPSS) version 24 for windows 10, also supported by graphical figures from Quadratics. The data from the primary research of the online questionnaire is presented and relationships between participants will be identified.

4.1 Primary Research – Online questionnaire Closed Questions

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In the Dark Web research study 47 participants took part, and were asked to complete 16 questions relating to the Dark Web. This section will look at the results of the close ended questions in the questionnaire.

Question 2

Participants were asked about their age and 68.8% of participants were in the 18-21 bracket, 19.1% were in the 22-25 bracket, 8.5% were in the 22-25 bracket and 8.5% were in the 30+ bracket, although the 30+ bracket does not fit with the research aim, the author has decided to keep their data in to see if there is a contrast to the younger participant’s data (see figure 4.1 below).

![Age of Participants](image)

Figure 4.1: percentage of participants age groups.

Question 3

Most participants stated that they knew about the Dark Web, with 69.57% answering yes to this question, and 30.43% answering no.

Question 4
Contrasting to the previous question, only 26.67% of the respondents have used the Dark Web, and 73.33% stated that they have not used it.

**Question 5**

Much of the participants stated that they feel like the Dark Web is relevant in today’s society with 67.44% of them answering yes, and 32.56% of participants responding no.

**Question 6**

Participants were asked when the Dark Web is mentioned what is their first thought about it, unsurprisingly 6.82% of respondents said that the thought was one of a positive thought, 47.73% stated that their thought was neutral, and the remaining 45.45% said that their thought was negative. (See figure 4.2 below)

![Figure 4.2: initial responses of the participants when the Dark Web is mentioned](image)

**Question 7**

Participants were asked if they thought the Dark Web had benefits. 16.28% (7 participants) of responses were probably yes, 25.58% (11 participants) said probably not, 25.58 (11 participants) said might or might not, 20.93% (9 participants) stated definitely yes, and 11.63% (5 participants) said defiantly not. (See figure 4.3)
Participants responded to the question on whether only people who are literate in IT could access the Dark Web. 40.91% (18 participants) said they neither agree or disagree with the statement, 25% (11 participants) said they agree with this statement, 15.91% (7 participants) said they strongly agree with this statement, 9.09% (4 participants) said they disagree with the statement, and 9.09% (4 participants) said they strongly disagree with the statement (see figure 4.4).

**Question 9**

Participants answered the question on whether only people who were literate in IT could access the Dark Web. 40.91% (18 participants) said they neither agree or disagree with the statement, 25% (11 participants) said they agree with this statement, 15.91% (7 participants) said they strongly agree with this statement, 9.09% (4 participants) said they disagree with the statement, and 9.09% (4 participants) said they strongly disagree with the statement (see figure 4.4).
Question 10

Participants were asked on their opinion on if the Dark Web helps promotes anonymity, 2.38% (1 participant) strongly disagreed with this statement, 4.76% (2 participants) said that they disagreed with the statement, 14.29% (6 participants) said that they neither agreed or disagreed with the statement, 30.95% (13 participants) said that they agree with the statement, and 47.62% (20 participants) strongly agreed with the statement. (See figure 4.5)

Question 11

Participants were asked on their opinion on the Dark Web only being used for illegal activities. 23.81% (10 participants) said that they neither agree or disagree with this statement, 21.43% (9 participants) stated that they agreed with this statement, 21.43% (9 participants) said that they strongly agreed with the statement, 19.05% (8 participants) stated that they disagreed with the statement, and finally 14.29% (6 participants) said that they strongly disagreed with the statement. (As seen in Figure 4.6 below)
Figure 4.6: Participants response to the Dark Web only being used for illegal activities

**Question 12**

Participants were asked if their opinion on the statement of the Dark Web having a bad public image. 4.88% (2 participants) said that they strongly disagree with the statements, 0% of participants stated that they disagree with the statement, 9.76% (4 participants) stated that they neither agreed or disagreed with the statement, 31.71% (13 participants) stated that they agreed with the statement, and 53.66% (22 participants) said that they strongly agreed with the statement. (See figure 4.7 below)
Participants were asked on their opinion on if the Dark Web was relevant in today’s society. 9.30% (4 participants) stated that they strongly disagree with the statement, 11.63% (5 participants) said that they disagreed with the statement, 25.58% (13 participants) stated that they neither agreed or disagreed with the statement, 30.58% (13 participants) stated that they agreed with the statement, and 23.26% (10 participants) said that they strongly agreed with the statement. (See Figure 4.8 below)
Participants response to the Dark Web being relevant in today's society

Figure 4.8: Participants response to the Dark Web being relevant

**Question 14**

Percipients were asked to give their opinion to the statement that nothing good has come from the Dark Web. 19.51% (8 participants) said that they strongly disagreed with this statement, 17.07% (7 participants) stated that they disagreed with the statement, 43.90% (18 participants) said that the neither agree or disagree with the statement, 7.32% (3 participants) said that they agreed with the statement, and 12.20% (5 participants) stated that they strongly agreed with the statement. (See Figure 4.9)
Participants response to nothing good has come from the Dark Web

Figure 4.9: Participants response to nothing good coming from the Dark Web

**Question 15**

Participants were asked what their response was to the statement that more people need to start using the Dark Web. 23.81% (10 participants) stated that they strongly disagreed with this statement, 21.43% (9 participants) said that they disagreed with the statement, 40.48% (17 participants) stated that they neither agreed or disagreed with the statement, 7.14% (3 participants) said that they agreed with the statement, and 7.14% (3 participants) stated that they strongly agreed with the statement. (See Figure 4.10 below)
Question 16

Participants were asked their option on the statement if a user using the Dark Web is untraceable. 20.93% (9 participants) stated that they strongly disagreed, 23.26% (10 participants) said that they disagreed with the statement, 32.65% (14 participants) stated that they neither agreed or disagreed with the statement, 13.95% (6 participants) said that they agreed with the statement, and 9.30% (4 participants) stated that they strongly agreed with the statement. (See figure 4.11)
This section will be looking at the results of the open-ended questions from the questionnaire.

**Question 3.1**

Participants were asked to give a concise description of what they knew of the Dark Web. The responses were collated and sorted into four categories: Illegal, Anonymous, Freedom of information and Other. 27.27% (9 participants) of respondent’s descriptions were categorised into the category of Illegal, 33.33% (11 participants) of the respondent’s descriptions were categorised into the category of Anonymous, 24.24% (8 participants) of the respondent’s descriptions were categorised into the category of Freedom of Information, and 15.15% (5 participants) of the respondent’s descriptions were categorised into the category of Other. (see Figure 4.12)
Participants were asked to follow up on question 5, of if they found the Dark Web revenant to give a reason why, their responses were then collated and analysed to be put into four categories: Privacy, Illegal Activities, Freedom of Information and Other. 20.58% (7 participants) responses were categorised into Privacy, 17.63% (6 participants) responses were categorised into Illegal Activities, 20.58% (7 participants) responses were categorised into Freedom of Information, and 41.17% (14 participants) responses were categorised into the Other Category. (See Figure 4.13)
Question 7.1

Participants were asked to follow up on question 7, of what benefits the Dark Web has, their responses were then collated and analysed to be put into four categories: General Privacy, Access Information, Access Items and Other. 23.07% (6 participants) responses were categorised into the category of General Privacy, 23.07% (6 participants) responses were categorised into the category of Access Information, 11.53% (3 participants) responses were categorised into the category of Access Items, 42.30% (11 participants) responses were categorised into the category of Other. (see Figure 4.14)

![Figure 4.14: Categorisation of correspondent’s idea of the Dark Webs benefits](image)

Question 8

Participants were asked what would make the user the Dark Web more often, their responses were then collated and analysed to be put into five categories: Better Public Image, Privacy Issues, Nothing, More User Friendly and Other. 16.21% (6 participants) responses were categorised into the category of Better Public Image, 18.91% (7 participants) responses were categorised into the category of Privacy Issues, 24.32% (9 participants) responses were categorised into the category of Nothing, 13.51% (5 participants) responses were categorised into the category of More User Friendly, 27.02% (10 participants) responses were categorised in the category of Other. (See Figure 4.15)
Figure 4.15: Categorisation of respondent’s reasons for using the Dark Web more often.
CHAPTER 5: Discussion

5.0 Discussion

This study was performed to investigate the relevance of the Dark Web to 18-30 year olds based in the UK. More specifically, focusing on their cyber security and if they find that using the Dark Web will benefit it. From the results of the study 69.57% of the respondents have had prior knowledge of the Dark Web, but only 26.67% of the respondents had used the Dark Web, in contrast to the regular internet where ONS (2016) reported that 98.8% of adults aged 16 to 44 use the internet daily.

5.1 Dark Web Use

From the primary research conducted it is obvious from the sample that the Dark Web is not used by the majority of the participants, with only 26% stating that they have actually used the tool. The author can see a coloration between the use of the Dark Web with the opinion of the relevance of it. Looking at the Dark Web from an objective standpoint it is valuable to highlight the advantages and disadvantages of using and facilitating the tool and relate these to the primary and secondary research.

5.1.1 Advantages

From secondary resources the biggest advantage that is mentioned is the anonymity of the Dark Web, obviously, TOR is not 100% anonymous, but it provides a big anonymity bonus for a user’s cyber security making it harder for governments to track and monitor individuals browsing habits. The majority of the sample 47% agree that the Dark Web promotes anonymity, Fu et al. (2010) reports that using a VPN along with TOR makes a user on the Dark Web 20 times more anonymous. Tor has also stated that they are in the process of revamping their coding for the tool, the revamp is designed to both strengthen the encryption and to let admins easily create their own Dark Web sites that can only be discoverable to those who know the long string of ‘unguessable’ characters. The co-founder of Tor Nick Mathewson states that this not only allows tighter privacy on the Dark Web, but it also helps to front for a new generation of encryption applications (Greenberg, 2017).
“That’s the beauty of the Dark Web you’re nearly complete anonymous on there, compared to using the regular internet and it’s amazing…. It’s just a shame that people don’t use it because of the image it has” (Appendix 3) it’s clear from this response from an interviewee that the anonymity is a large driving factor for the Dark Web, but because of the public image the interviewee states that’s a reason why it isn’t used, which the author will discuss later in this chapter.

There is no denying that the popularity of crypto currency’s, has mostly come from the Dark Web, although the use of these currencies most popularly being Bitcoins isn’t the most legal in practice. “I feel like the popularity of bitcoins is an advantage of the Dark Web…. What I mean by this is it’s a new technology in a sense but also for ‘normal’ people to have created a new currency that can’t be governed by any countries is amazing” (Appendix 3). From this the author can back up the initial statement, that by-products can be produced from the Dark Web, and its content sites like Silk Road and other Dark Web marketplaces deal only in Bitcoins because it helps protect both parties (buyer and seller) in the transaction keeping both anonymous. Caffyn et al. (2015) reports that the Dark marketplace is the ‘killer application’ for bitcoin, and that drug purchases make up the largest proportion of transactions using the digital currency.

5.1.2 Disadvantages

Usability and Accessibility have come out as a significant factor of people not using the Dark Web. “I think there’s a big misconception with people on how to use the Dark Web, people seem to think that you have to be a computer genius to be able to access that, when we both know that’s not the case” (Appendix 3) From the authors time conducting this research project, when asked by colleagues and aquainters, the author is always met with the reaction of so how much technological knowledge do you need to access the Dark Web, and on few occasions the author has displayed how simple it is via TOR, which has led to the “oh I didn’t realise it was that easy” response, furthering this point from the primary research 40% of respondents said they neither agreed or disagreed with the statement of “only people who are knowledgeable with computers can access the dark web” and 40.91% of people that had a combined opinion of either agree or strongly agree had that opinion. This just further highlights the problem of misconception, and the author believes that if it were more common knowledge of how accessible the Dark Web was more people would use the tool.
Although the author has previously stated that the anonymity is an advantage of the Dark Web, it is also a double-edged sword as it also protects the ‘scum’ who use the Dark Web, this will be discussed more in detail later in the chapter.

The author deems that there are many possible reasons as to why the Dark Web is not being used but what is clear from the analysis of the primary data is that the public image of the tool is the issue for most people not using it.

5.2 Public Image

From the primary data collected, it is clear that the Dark Net has an issue of its public perception, as 46% of people when the Dark Net is mentioned have a negative first opinion, and 47% have a neutral option with only just 6.8% having a positive opinion. The author perceives this as one of the deciding factors of an individual not using the Dark Web. From primary research the author can deem that from the negative opinion there are 3 main categories of content that the public thinks that the Dark Web can provide an individual, which are: Drugs, Indecent images, Acts of Terrorism.

5.2.1 Drugs and Drug Trade on the Dark Web

“Dark Web market admins are learning that “if you’re trustworthy, you stay up for a while, the heat increases and eventually you get nailed by the feds,”” (Greenberg, 2016). One thing the research cannot deny is the prevalence of drugs, and more importantly drug trade the Dark Web provides for a user. Silk Road being the biggest online marketplace for drugs on the Dark Web before being shut down by the FBI in October 2013, with its successor silk road 2.0 closed 2014 by FBI Europol (Leger, 2014), and Silk road 3.0 is a shell of what the original Silk Road stood for. With these drug markets being so active and used this shows there is a clear demand in the market for this service, with around 1 in 12 (8.4%) of adults aged 16-59 admitted that they had taken illegal drugs in the period of 2015-2016 (DrugWise, 2017). The statement the author is trying to project is that the drug trade isn’t just confined to the Dark Web and for a “average” drug user if anything using the Dark Web content such as Silk Road can be beneficial for them as it allows them to shop around for the best price and
quality rather than using one dealer, alongside with the anonymity aspect it seems like there would be no reason not to use it.

"whenever the Dark Web is even mentioned in conversation it always leads to the drug market and why it’s even allowed in the first place”

The quote above was one made during an interview conducted about the Dark Web, for the more apprehensive people who don’t agree with this side of the Dark Web, if anything the police and law enforcement agencies can use Dark Web site such as silk road to firstly monitor the drug trade and also conduct stings on people looking to be supplied with mass quantities of drugs with the intentions to sell to the general public, with RAND reporting that police are conducting covert surveillance and monitoring of the Dark Web, posing as buyers and also sellers of illegal drugs (RAND Europe, 2016). Figure 5.1 looks at the current active .onion Dark Web pages on the hidden wiki that relate to drug use and drug trade, what’s interesting to see from figure 5.1 is that a user has edited the Hidden Wiki page to display “DREAM MARKET is a SCAM!! REMEMBER THE NAME AND NEVER USE IT!!” the author has been monitoring the Hidden Wiki page for a period of 7 days and that has not been removed or changed, is this an example to the general public that not all users are evil and are looking out for the general population, but it could also be a disgruntled customer or rival drug selling site trying to slander and take away the business.
Figure 5.1: Hidden Wiki results on Dark Web .onion links relating to Drugs

### 5.2.2 Indecent images and Paedophiles on the Dark Web

The biggest misconception with the Dark Web is that it is full of Paedophiles and indecent images of children (which is often referred to as CP by internet users), the author blames the mainstream media for this misconception, when using the normal internet to search for Dark Web or Dark Web you will get in return news articles about drug trading, elite hackers using this tool and paedophiles and paedophile rings using it to distribute and facilitate indecent images of children. "child abuse sites only represent 2% of tors hidden services" (Greenberg, 2014) but with this information in mind a report conducted found that around 80% (Owen & Savage, 2014) of visits on the Dark Web were to do with indecent images of children or activities relating to it. Just because there are individuals who use the Dark Web for appalling uses does not mean the tool should be damned by the rest of society, it’s akin to saying that people speed on roads causing crashes therefore roads should be abolished, which is nonsense and therefore it is nonsense to say that nobody should use the Dark Web.
There is no disputing that despite what the media portrays about indecent images that it’s not the case, and if the right information was distributed then maybe there would be less of a negative image of the Dark Web. Figure 5.2 looks at the hidden wiki, its contents are categorised and in the Adult and Erotica very few of the Dark Web links relate to indecent images and images relating to paedophilia.

<table>
<thead>
<tr>
<th>ADULT</th>
</tr>
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<tbody>
<tr>
<td>• VideosEIC - Webcam videos: 18+ only. Caution: Possible scams</td>
</tr>
<tr>
<td>• Cute Sweet Teenies (&lt;18) - Come to one of the greatest chat sites. Nadie And NN Teen Girls. Caution: CleanNet</td>
</tr>
<tr>
<td>• Madam Sexygirls d-c @ 20000+ videos from sites like pornhub, redtube, xhamster, xvideos, etc… And new videos are added hourly!</td>
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<table>
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<tr>
<th>Erotica</th>
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<tbody>
<tr>
<td>• Darkscandals @ 3 sites with real Rape, Blackmail and Forced videos (Pack 7 is out since February 12, 2017)</td>
</tr>
<tr>
<td>• Hijab FUCK Girls @ ISIS don’t like to see this. But their Muslim Girls want to get naked and fucked.</td>
</tr>
</tbody>
</table>

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<tr>
<th>Noncommercial (E)</th>
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</thead>
<tbody>
<tr>
<td>• X Nordic Scandinavian Amateurs @ Amateur pictures from Nordic woman (Sweden, Norway, Denmark, Iceland and Finland)</td>
</tr>
<tr>
<td>• XCOMICO @ Adult comics</td>
</tr>
<tr>
<td>• Pink Meth archive @ One of the archives of the now defunct Pink Meth site. amateur pictures with names.</td>
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</table>

<table>
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<tr>
<th>Commercial (E)</th>
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<tbody>
<tr>
<td>• Bitlit NSFW @ clenamet @ - Buy or sell original NSFW pictures for Bitcoins.</td>
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<table>
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<tr>
<th>Animal Related</th>
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<tbody>
<tr>
<td>• Animal Porn Plus @ Hot Girls Loves Her Pets</td>
</tr>
<tr>
<td>• The Secret Story Archive #1st @ - Big cat zoophile stories. artwork. links and forum.</td>
</tr>
<tr>
<td>• The Secret Story Archive #2nd @ - Mirror of #1st</td>
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<tr>
<td>• Zoo @ - Zoophilia-related imageboard</td>
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<table>
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<tr>
<th>Other</th>
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<tbody>
<tr>
<td>• TalAdvisService @ - Professional anonymous global goods partners.</td>
</tr>
<tr>
<td>• VOR-COM Archive gh - Archive of the VOR-COM. Contains lore!</td>
</tr>
<tr>
<td>• Madam File Storage @ Archives of belligerent canines (sensored) files, such as guides for making methamphetamine, suicidal notes, etc. Anonymous users can submit files. Also a tor link directory. [temporarily down/empty for renovation]</td>
</tr>
</tbody>
</table>

Figure 5.2: list of .onion web pages under the Erotica and Adult categories

It is quite clear from figure 5.1 that the indecent image related .onion sites are labelled, so the misconception tall tale of when the dark web is mentioned that “I went on the dark web and all I saw was indecent images” is a complete lie, as you cannot accidentally stumble onto the sites like you do with the normal internet.

5.2.3 Terrorism and Terrorism Issues on the Dark Web

“Despite many advantages, misuse of the Internet has become ever more serious, however. Terrorist organizations, extremist groups, hate groups, and racial supremacy groups are using the Web to promote their ideology, to facilitate internal communications, to attack their enemies, and to conduct criminal activities.” (Chen et al. 2006) When the tragic attack that happened in America on September 11th, 2001, a new wave of fear had hit the general public,
the fear of Terrorism. Along with the real-world implications, it also gave the internet and Dark Web something new for individuals to be fearmongering over. “it’s got a lot of terrorist support and discussion forums on it, doesn’t it” this was one response on the survey and it seems fully justifiable, with terrorists using the Dark Web for fundraising, money transfers and the purchase of illegal weapons, using crypto currencies like bitcoins. One example of a Dark Web page is “Fund the Islamic struggle without leaving a Trace” this page asks visitors to donate to the jihadists with bitcoins. (Weimann, 2016)

“I think that privacy, ultimately, and our right for privacy is more important than our fear of bad things happening, like terrorism.” (Durov, 2016)

5.3 Is It relevant?

With all of this in mind, the question of the research topic is still left to be unanswered, is the Dark Web perceived as relevant? Looking at the primary research 67.44% of the respondents deem that it is, but further on in the questionnaire respondents were asked again if they found the Dark Web relevant in today’s society and 53.49% displayed a positive opinion to the statement, 25.58% had a neutral and 20.93% had a negative opinion, this further backs up the research question of the dark web is perceived as relevant. The author also speculates that, at this current time there is not a large consensus from the public that their cyber privacy is in breach but this could be due to them not being informed, and until an Edward Snowdown level of whistleblowing happens on the UK government on what they are collecting on its citizens, then the issue will not be something that is widely regarded.

CHAPTER 6: Conclusions and Recommendations
6.0 conclusion and recommendations

This chapter summarises and concludes on the research problem and comes up with a recommendation for the issue.

Looking on the aim of the investigation, which was to investigate if 19-30 year olds saw the Dark Web as relevant, and from the primary and secondary research the author can see a pattern that 19-30 year olds can see the relevance of the Dark Web but don’t necessarily see it as relevant to them. The primary research collected gives the author the impression that using the Dark Web would be a last resort rather than something that the sample would use daily.

6.1 Recommendations

Recommendations for Dark Web Users:
- debunk myths to peers when asked about the Dark Web
- Aim to make the Dark Web a less elitist place

Recommendations for TOR developers:
- Develop a marketing campaign promoting the usefulness of TOR
- Have another campaign about debunking TOR and Dark Web myths
- Continue to develop and improve on the encryption and security of the TOR client

6.2 Limitation of the Data and data reliability

Throughout the duration of this investigation a number of limitations occurred, which could have affected the overall conclusions that were made. A limitation of this study was the small sample size of 47 participants, which could be due to a numerous of reasons, firstly it could be to do with the constraint of time to collect data and then complete the writing up on the investigation. There is also the limitation of sample bias, as a convenience sample technique was used. The main objective for gathering a large sample is to have a more valuable representation of the sample target and therefore have a more valuable and reliable outcome.

The timescale of the investigation was the most prominent restriction as there was a set deadline for the completion of the dissertation, on top of this data collection could not be
started until the author had full ethical approval which did not happen until December 2016, which gave less time to the author to get data from their primary data collection.

Another possible limitation is the use of self-created questionnaire when has not been previously tested, regarding its validity and reliability and has not been used in previous studies. The main aim of using a questionnaire is to get a general view of a specific problem, and although the data collected was to a good standard it wasn’t quite in depth enough to fully support the discussion, if no interviews were conducted then, the author feels like there wouldn’t have been an accurate representation of the sample area.

Another limitation of the data is bias in the semi-structured interviews, although the author took steps to mitigate this, because of how the interviews were conducted the author could have asked questions or guided the interview in a way to get the responses that the author wanted for the investigation.

6.3 Further Research

The research problem of the relevance of the Dark Web is still in need of further investigation, to further this project and area of research possible suggestions could include; to focus on other aspects of using the tool such as the anonymity factor, the reliability of information from the Dark Web and other aspects. It would be interesting to study frequent Dark Web users to view what activities they partake in when using the tool. As this current project looks at the age bracket 18-30 year olds it would be an interesting expansion to look at the 31-42 bracket to see if there is a contrast in opinions or if they align similarly.

The Dark Web is ever evolving each day, and more people are being persuaded to use or not use the tool. Gathering data on perceptions and documenting the advantages and disadvantages of the Dark Web, might increase awareness of the population, to a point where they are aware of the correct facts about the Tool and don’t rely on the mainstream media for their opinion. It is also evident that technology is continuing to rapidly progress, and with that the TOR client, the author would be extremely interested to see how different the data would be, if it were collected in five years’ time.

It is important to consider all the limitations that were previously mentioned, as they have an impact on the current study, the findings cannot be generalise to the whole targeted
population because of the small size of the sample. If further studies consider these limitations when furthering the research, it can provide more valuable data, which can help further map the research problem of the relevance of the Dark Web.

6.4 Reflection

The investigation and the overall project can be claim as a success, as the aim: ‘investigate if 18-30 year olds recognise if the Dark Web is a relevant tool in today’s technological age, focusing on the use of it based on their cyber privacy’ was accomplished by completing the objectives that were stated at the beginning of this study. During the investigations lifespan, there was a vast amount of literature on the subject area although some was not as academic in nature as others, but they could not all be incorporated into the study due to the limited timescale. Because of the subject area, it was possible for the research to obtain data from various new sources which made the discussion and investigation conclusions up to date. Ultimately the research project has been a valuable experience and would be a stimulating read to anyone with a curiosity on the Dark Web.

6.5 Conclusions

The concluding chapter of this research project has considered how the aim of the investigation was achieve via the set-out objectives. There have been recommendations to an individual about the utilization of the dark web. The limitations of the research project have been looked at and discussed, such as sample size and time constraints and suggestions have been provided to researches who are looking to conduct similar investigations or further the investigation in the future. The chapter also contains a personal reflection created by the author, which notes the strengths and weaknesses that were posed by the study. To close the author deems this investigation a success, and believes anyone who has an interest in the topic area will enjoy reading this dissertation from beginning to end.
7.0 References


Durov, P, Kaplan, S (2015) Founder of app used by ISIS once said, ‘We shouldn’t feel guilty.’ On Wednesday he banned their accounts, (online). Available at:

40


Available at:


Weimann, G. (2016). Terrorist Migration of the Dark Web. Perspectives on Terrorism is a journal of the Terrorism Research Initiative and the Centre for Terrorism and Security Studies, 10(3).


8.0 Bibliography


Kaplan, F (2015) *Dark Territory: The secret history of cyber war*


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**9.0 Appendix**

**1.0 Ethics**

**DEVOLVED ETHICS APPROVAL APPLICATION SUMMARY**

Student Name: Sion Wyn Irfon Davies  
Student Number: 20063406

Module Name: Information Systems Project  
Module Number: BC06000
Programme Name: BSc (Hons) Business Information Systems  Supervisor Name: Dr Hilary Berger

<table>
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<th>Student Signature</th>
<th>Supervisor Signature</th>
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<td>Application for ethics approval</td>
<td>Yes</td>
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<tr>
<td>Participant information sheet</td>
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<td>Participant consent form</td>
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Student Signature: Sion Wyn Irfon Davies  Supervisor Signature: Yes

Application for ethics approval: [✓]  Participant information sheet: [✓]  Participant consent form: [✓]  Pilot interview/s: [✓]  Pilot questionnaire/s: [✓]  Letter/s to participating organisation/s: [ ]  Confirmation of interviewee participation: [✓]

For use by the devolved ethics approval panel:

Panel Members  Name  Signature

Module Leader, Chair :  
Supervisor: Dr Hilary Berger  
CM Ethics Committee Representative:  

Date:  
Date of Reassessment:  

Outcome:

Project Approved: [✓]  Reference number issued: 2016D0184  Chair’s Action: [ ]  Application Not Approved: [ ]

Comments for projects not fully approved:

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

**If the project requires ethics approval from an external agency (e.g., NHS), you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your ethics letter(s) of approval in order that your School has a record of the project.**

The document **Ethics application guidance notes** will help you complete this form. It is available from the Cardiff Met website. The School or Unit in which you are based may
also have produced some guidance documents, please consult your supervisor or School Ethics Coordinator. Once you have completed the form, sign the declaration and forward to the appropriate person(s) in your School or Unit.

PLEASE NOTE:
Participant recruitment or data collection MUST NOT commence until ethics approval has been obtained.

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<td><strong>Name of applicant:</strong></td>
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<td><strong>School / Unit:</strong></td>
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<td><strong>Student number (if applicable):</strong></td>
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<td><strong>Programme enrolled on (if applicable):</strong></td>
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<td><strong>Approximate duration of data collection:</strong></td>
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<td><strong>Funding Body (if applicable):</strong></td>
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<td><strong>Other researcher(s) working on the project:</strong></td>
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<td><strong>Will the study involve NHS patients or staff?</strong></td>
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<td><strong>Will the study involve taking samples of human origin from participants?</strong></td>
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**Does your project fall entirely within one of the following categories:**

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<td>Paper based, involving only documents in the public domain</td>
<td>No</td>
</tr>
<tr>
<td>Laboratory based, not involving human participants or human tissue samples</td>
<td>No</td>
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<td>Practice based not involving human participants (eg curatorial, practice audit)</td>
<td>No</td>
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<td>Compulsory projects in professional practice (eg Initial Teacher Education)</td>
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<tr>
<td>A project for which external approval has been obtained (e.g., NHS)</td>
<td>No</td>
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If you have answered YES to any of these questions, expand on your answer in the non-technical summary. No further information regarding your project is required. If you have answered NO to all of these questions, you must complete Part 2 of this form.
In no more than 150 words, give a non-technical summary of the project

The project aims to investigate the public perception of the dark web and if it is still relevant and useful in today's technological world. The author will conduct primary research by semi-structured interviews and an online questionnaire to gauge the opinions of the sample. The results of the research will be delved into during the investigation.

DEARATION:
I confirm that this project conforms with the Cardiff Met Research Governance Framework

I confirm that I will abide by the Cardiff Met requirements regarding confidentiality and anonymity when conducting this project.

STUDENTS: I confirm that I will not disclose any information about this project without the prior approval of my supervisor.

Signature of the applicant:  
Sion Wyn Irfon Davies  
Date:  09/11/2016

FOR STUDENT PROJECTS ONLY

Name of supervisor:  
Dr Hilary Berger  
Date:  09/11/2016

Signature of supervisor:  
Dr Hilary Berger

Research Ethics Committee use only

Decision reached:  
- Project approved  ✔  
- Project approved in principle  
- Decision deferred  
- Project not approved  
- Project rejected

Project reference number:  Click here to enter text.

Name: Dr Jason Williams  
Date:  24/11/2016

Signature:

Details of any conditions upon which approval is dependant:  
None

PART TWO

A RESEARCH DESIGN

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>A1 Will you be using an approved protocol in your project?</td>
<td>No</td>
</tr>
<tr>
<td>A2 If yes, please state the name and code of the approved protocol to be used†</td>
<td></td>
</tr>
</tbody>
</table>

† An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here
A3 Describe the research design to be used in your project

This study concerns an interpretive research philosophy using an inductive research strategy to collect qualitative data.

Online Questionnaire:
• The researcher aims to have 50 completed online questionnaires.
• The researcher has created an online account on survey monkey.
• The participants will be told details of the study and its goals, also the participant must consent before completing the questionnaire.
• Online questionnaires will be posted by January 16th for fourteen days.
• The questionnaire will take 10 minutes to complete.

Sample:
• A convenience sample of available participants at Cardiff Metropolitan computing and information systems student body, will be asked to complete the questionnaire. However, by conducting the research at the student body, the researcher does have control over the representativeness of the sample, thus it is also a purposive sample. The purposive sample is selected as they have the characteristics of the target audience.
• Further participants may be found by using snowballing techniques, by asking participants to recommend and share the questionnaire link with other people who may be appropriate for the study.

Semi structured interviews:
• Open ended questions to collect qualitative information.
• Freedom of response will allow the researcher to gain opinions and thoughts of the participant.
• The researcher intends to have face to face interview with 6 computing and information systems orientated people; lectures, undergraduate students, postgraduate students etc.
• Contact with the individuals will being in December and the interview is forecasted to take place at the end of January/February.
• Each interview will be recorded and will be at maximum 20 minutes in length.

Sample:
• A quota sample of 3 computing and information systems related participants as they have the characteristics required by the study

Participants:
• The types of samples chosen are to guarantee no discrimination against age, gender, race, disability etc.
• All participants will be over the age of 18.
• Participants right to anonymity will be reiteration throughout the research process and they may withdraw their data at any point.
• The researcher will only record age and gender of the participant.

Analysis:
• Explorative analysis of the quantitative data gathered from the questionnaires will include a variety of subjective and objective measures of the variables
involved [descriptive statistical analysis, correlations and relationships] utilising Microsoft Excel for creation of graphs, tables and charts.
- The qualitative data from the semi structured interview will be through observer impression of the specific use of the specific use of the data collected to help support the proposal.

Consent:
- Consent from participants is required from the interviewees by the completion of the consent form before they can take part in the study.
- All participants will remain anonymous, any data provided will not be traceable back to specific people
- All participants will have the right to withdraw their information at any point of the projects lifespan

Data:
- All data will remain confidential and will be stored securely in a password protected computer system.

<table>
<thead>
<tr>
<th>A4 Will the project involve deceptive or covert research?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5 If yes, give a rationale for the use of deceptive or covert research</td>
<td>N/A</td>
</tr>
<tr>
<td>A6 Will the project have security sensitive implications?</td>
<td>No</td>
</tr>
<tr>
<td>A7 If yes, please explain what they are and the measures that are proposed to address them</td>
<td>N/A</td>
</tr>
</tbody>
</table>

B PREVIOUS EXPERIENCE
B1 What previous experience of research involving human participants relevant to this project do you have?
N/A
B2 Student project only
What previous experience of research involving human participants relevant to this project does your supervisor have?
Dr Hilary Berger has 14+ years of experience of research involving human participants relevant to the project.

C POTENTIAL RISKS
C1 What potential risks do you foresee?

Online Questionnaires
- online questionnaires may present risk to the researcher:
  - There might not be enough responses to the questionnaire
  - Participants might want to withdraw their results from the dataset

Semi Structured Interviews
- Face to face interviews may present risk to the researcher:
  - The interviewee may get anxious about what has been stated to the researcher which may lead towards unwanted aggression/anger to the researcher.
  - The interview may hit a stalemate and the information may not be valid
C2 How will you deal with the potential risks?

Semi Structured Interviews
- These will be arranged in advance at a location confirmed by the researcher and participant. The researcher will also have their mobile phone with them during the interview.
- Participation information sheet and consent form will be sent to the interviewee to ensure they are aware of the topics up for discussion.
- The participant will have the right to withdraw their data at any point without penalty.

Online Questionnaires
- A form of consent and project description will be at the beginning of the questionnaire for the participants to read and sign to ensure they are fully aware of their participation.
- The researcher will ensure that all questions will be suitable and appropriate to ask participants.
- The participants will be notified that they have the right to withdraw their data at any time.

Project
- A Gannt chart will be created and followed to minimise workload on the researcher.

When submitting your application you **MUST** attach a copy of the following:
- All information sheets
- Consent/assent form(s)

An exemplar information sheet and participant consent form are available from the Research section of the Cardiff Met website.

2.0 Questionnaire

Dark Web Questionnaire

School of Management, Cardiff Metropolitan University  An Investigation into the opinion of the relevance of the Dark Web My name is Sion Davies and am currently a final year student at Cardiff Metropolitan University. In order to complete my third year of study I am required to complete a dissertation. The primary data collected from this questionnaire will provide me with the information to complete my dissertation. This project has received the approval of Cardiff School of Managements’ Ethics Committee, Cardiff.
Metropolitan University. By taking part in the questionnaire you agree to the following: I understand that my participation in this project will involve completing a questionnaire about the relevance of the dark web in today's society, which will take approximately 5-7 minutes of my time. I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason or I can discuss my concerns with Sion Davies of Cardiff Metropolitan University: st20063406@outlook.cardiffmet.ac.uk

Dr. Hilary Berger Dissertation supervisor and lecturer in Cardiff Metropolitan University: HBerger@cardiffmet.ac.uk

I understand that any identifying information provided by me will be held confidentially, such that only the PI (Sion Davies) can trace this information back to me individually. I understand that my data will be stored on password protected computers, anonymised after completion of the survey and that no one will be able to trace my information back to me. The raw data will be retained for five years when it will be deleted/destroyed. If you are 18 years of age or over, understand the statement above and freely consent to participate in this study please tick the consent box to proceed. Thank you very much for helping with this project and participating in the research.

☐ I consent to the above

How old are you?

☐ 18-21
☐ 22-25
☐ 26-29
☐ 30+

Do you know about the Dark Web?

☐ Yes
☐ No

If yes, please give a short description of what you know about it

Have you ever Used the Dark Web?

☐ Yes
☐ No
Would you consider the Dark Web to be relevant in today’s society?
☐ Yes
☐ No

Why?

When the Dark Web is mentioned what is your initial response?
☐ Positive
☐ Neutral
☐ Negative

Do you believe that the Dark Web has benefits?
☐ Definitely yes
☐ Probably yes
☐ Might or might not
☐ Probably not
☐ Definitely not

What benefits?

What would make you use the Dark Web more often?

This next section will have you rating statements based on the Dark Web, on a rating scale of 1-5. 1 being strongly disagree and 5 being strongly agree

Only people who are knowledgeable with computers can access the Dark Web
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
The Dark Web promotes anonymity
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

The Dark Web is only used for illegal activities
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

The Dark Web has a bad public image
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

The Dark Web is relevant in today's society
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
Nothing good has come from the Dark Web
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

More people need to start using the Dark Web
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

You are untraceable using the Dark Web
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5

3.0 Semi-structured interviews

PARTICIPANT INFORMATION SHEET

Is the Dark Web still relevant?

Project summary
The purpose of this research project is to investigate the current public opinion on the relevance of the Dark Web. Your participation will enable the collection of data which will form part of a study being undertaken at Cardiff Metropolitan University.

Why have you been asked to participate?
You have been asked to participate because you fit the profile of the population being studied; that is you are over the age of 18 and work or have relevant IT experience and knowledge. Your participation is entirely voluntary and you may withdraw at any time.

**Project risks**
The research involves the completion of a questionnaire and participation for an interview and which will be recorded for later analysis. We are not seeking to collect any sensitive data on you; this study is only concerned with your opinions on the Dark Web. We do not think that there are any significant risks associated with this study. However, if you do feel that any of the questions are inappropriate then you can stop at any time. Furthermore, you can change your mind and withdraw from the study at any time – we will completely respect your decision.

**How we protect your privacy**
All the information you provide will be held in confidence. We have taken careful steps to make sure that you cannot be directly identified from the information given by you. Your personal details (e.g. signature on the consent form) will be kept in a secure location by the research team. When we have finished the study and analysed all the information, the documentation used to gather the raw data will be destroyed except your signed consent form which will be held securely for 5 years. The recordings of the focus groups/ interview will also be held in a secure and confidential environment during the study and destroyed after 5 years.

YOU WILL BE OFFERED A COPY OF THIS INFORMATION SHEET TO KEEP

If you require any further information about this project then please contact:
Sion Davies, Cardiff Metropolitan University
Cardiff Metropolitan University email: st20063406@cardiffmet.ac.uk
Dr Hilary Berger, Dissertation Supervisor
Cardiff Metropolitan University email: H Berger@cardiffmet.ac.uk

PARTICIPANT CONSENT FORM

Cardiff Metropolitan University Ethics Reference Number: Participant name or Study ID Number: Thomas Miller
Title of Project: An investigation into whether 18 -30 year olds view the Dark Web as relevant- A perspective of cyber privacy
Name of Researcher: Sion Davies

Participant to complete this section: Please initial each box.

55
1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [X]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [X]

3. I agree to take part in the above study. [X]

4. I agree to the interview recorded [X]

5. I agree to the use of anonymised quotes in publications Yes No [X] [X]

Signature of Participant ___________________________ Date 02/02/2017
Thomas J Miller

Name of person taking consent ___________________________ Date 02/02/2017
S. Davies

Signature of person taking consent
Sion Davies

Order of semi structured Interview

<table>
<thead>
<tr>
<th>Discussed</th>
<th>1) Ask respondent approval to use recording systems Ask respondent to sign and acknowledge consent form</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>2) Ask Background questions Confirm information about;</td>
</tr>
<tr>
<td>X</td>
<td>• name of participant</td>
</tr>
<tr>
<td>X</td>
<td>• respondents position/experience in IT</td>
</tr>
<tr>
<td>X</td>
<td>3) Discuss about Dark Web Probes What they know about it</td>
</tr>
<tr>
<td>X</td>
<td>• Opinion of it</td>
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PARTICIPANT INFORMATION SHEET

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PARTICIPANT CONSENT FORM

Cardiff Metropolitan University Ethics Reference Number: 
Participant name or Study ID Number: Joshua Todd
Title of Project: An investigation into whether 18 -30 year olds view the Dark Web as relevant- A perspective of cyber privacy
Name of Researcher: Sion Davies

Participant to complete this section: Please initial each box.

6. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [X]

7. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [X]

8. I agree to take part in the above study. [X]

9. I agree to the interview recorded [X]

10. I agree to the use of anonymised quotes in publications
   Yes No [X] [X]

Signature of Participant ____________________________________________________________________________ Date ____________________________________________________________________________
<table>
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<tr>
<th>Order of semi structured Interview</th>
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<td>2) Ask Background questions</td>
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</tr>
<tr>
<td>Confirm information about:</td>
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</tr>
<tr>
<td>3) Discuss about Dark Web Probes</td>
<td>X</td>
</tr>
<tr>
<td>• What they know about it</td>
<td>X</td>
</tr>
<tr>
<td>• Opinion of it</td>
<td>X</td>
</tr>
<tr>
<td>• Good or bad for privacy</td>
<td>X</td>
</tr>
<tr>
<td>• More relevant today than 10 years ago</td>
<td>X</td>
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PARTICIPANT INFORMATION SHEET

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If you require any further information about this project then please contact:
Sion Davies, Cardiff Metropolitan University
Cardiff Metropolitan University email: st20063406@cardiffmet.ac.uk
Dr Hilary Berger, Dissertation Supervisor
Cardiff Metropolitan University email: H Berger@cardiffmet.ac.uk
PARTICIPANT CONSENT FORM

Cardiff Metropolitan University Ethics Reference Number:
Participant name or Study ID Number: Wayne Ng
Title of Project: An investigation into whether 18 -30 year olds view the Dark Web as relevant- A perspective of cyber privacy
Name of Researcher: Sion Davies

Participant to complete this section: Please initial each box.

11. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [X]

12. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [X]

13. I agree to take part in the above study. [X]

14. I agree to the interview recorded [X]

15. I agree to the use of anonymised quotes in publications [X] [X]

Signature of Participant ___________________________ Date 14/02/2017
Wayne Ng
Name of person taking consent ___________________________ Date 02/02/2017
S. Davies
Signature of person taking consent ___________________________
Order of semi structured Interview

<table>
<thead>
<tr>
<th>Order</th>
<th>Question</th>
<th>Discuss</th>
</tr>
</thead>
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<tr>
<td>1)</td>
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</tr>
<tr>
<td></td>
<td>Ask respondent to sign and acknowledge consent form</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>Ask Background questions</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Confirm information about:</td>
<td></td>
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<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>• respondents position/experience in IT</td>
<td>X</td>
</tr>
<tr>
<td>3)</td>
<td>Discuss about Dark Web</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Probes</td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<td>X</td>
</tr>
</tbody>
</table>

Transcript of Interview 1 – Thomas J Miller

S- Hello thanks for taking the time to do this interview
T- No problem
S- just for technicality purposes can you just confirm your name and what you do
T- Sure, my name is Thomas Miller, and I’m currently a student.
S- Great, so do you have much experience in IT?
T- well I know how to use a computer, I’m on one for most of the day ha-ha. But I don’t really work with them or know a great deal but I would say I’m knowledgeable on IT in general.
S- so as you know my research is on the Dark Web, so I was just wondering what do you know about the Dark Web?
T- well I know about silk road and how it’s pretty easy to buy drugs on there, I also know that you can buy some really dangerous things like guns and explosives.
S- so it sounds like you have a pretty knowledgeable idea about the more illegal aspects on the Dark Web then, what would you say your opinion on it was?
T- I don’t really know I guess I would say I’m not positive about it but I’m not really negative.
S- so you are neutral?
T- Yeah you could say that.
S- would you say it’s good for your privacy?
T- well obviously, That’s the beauty of the Dark Web you’re nearly complete anonymous on there, compared to using the regular internet and it’s amazing, but there’s always two sides to a coin and although it protects good people it also protects those dogey individuals who use it, but I don’t think it’s that big of a problem. It’s just a shame that people don’t use it because of the image it has.
S- you talked about anonymity but you didn’t really answer if you thought it was good for the privacy, would you care to answer that?
T- I think it’s good for privacy in general yes, but I don’t really think that’s a good thing if you understand my reasoning, with such good privacy it stops the bad people from being caught.
S- so you think the Dark Web is a good thing?
T- I’m not sure, its privacy strong, but if that’s actually a good thing I’m undecided.
S-that’s really interesting, one last thing and then that’s it, do you think it’s more relevant now than say 10 years ago?
T- Yes, but not a good relevance, it’s got a lot of terrorist support and discussion forums on it, doesn’t it which is really relevant today. I think if there was a way to stop them then it would be a good tool, but then that just defeats the point of the Dark Web then doesn’t it.
S- thanks for your time.

Transcript of Interview 2 - Joshua Todd
S- Hi, welcome take a seat thanks for being here
J- no problem I really like the topic so I was happy to do this interview.
S- just for the sake of the recordings can you state your name and what you do.
J- Joshua Todd, I’m a junior web developer.
S- that’s great thanks, so would you say you have a lot of IT experience
J- yes
S- So you know that my research is on the Dark Web, so what do you know about it?
J- well I’ve seen some friends purchase drugs from silk road a few years ago.
S- that’s interesting, would you associate the Dark Web with drugs then?
J- well, whenever the Dark Web is even mentioned in conversation it always leads to the
drug market and why it’s even allowed in the first place, obviously, my friends bought some
so I’m not really pro drugs but it’s still a bit weird at how easy the transaction was.
S- speaking of easy, do you think it’s hard to access the Dark Web?
J- I think there’s a big misconception with people on how to use the Dark Web, people seem
to think that you have to be a computer genius to be able to access that, when we both know
that’s not the case
S- so would you say that the Dark Web is relevant?
J- well obviously, its relevant it can be boiled down to being a rebellious tool that people use
to rebel again the government, and I don’t blame them with things like the investigatory
powers bill coming in, but then again I don’t really see why people are making such a big
deal out of it, if they haven’t done anything wrong then the surely don’t have anything to
hide.
S- that’s certainly a different viewpoint on it, I don’t quite agree with that I think everyone
has the right to privacy.
J-I guess so
S- Do you think that the Dark Web is more relevant now than it was say 10 years?
J- Well I guess it’s more relevant now yes, but I also think it’s a less common thing to be
used now.

Transcript of Interview 3 – Wayne Ng

S- Hello thanks for taking the time to do this interview
W- it’s okay
S- just for technicality purposes can you just confirm your name and what you do
W- My name is Wayne, and I’m a student but also help manage a web production company.
S- Great, so do you have much experience in IT?
W- I run my own clan webpage that I built from scratch so I would say I’m fairly knowledge
on IT

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S- that’s really interesting, so what do you know about the Dark Web?
W- admittedly I don’t know a great deal about it to be honest, I know that you can only access it with special software, but that’s around it.
S- that’s about the right jist of it, it’s a lot of seedy things like gun markets and drug trades.
W- they use bitcoin on it, don’t they?
S- yes that’s right, you know about bitcoins then?
W- yes. I feel like the popularity of bitcoins is an advantage of the Dark Web, What I mean by this is it’s a new technology in a sense but also for ‘normal’ people to have created a new currency that can’t be governed by any countries is amazing
S- that’s an interesting insight I never thought of it like that, so do you think the dark web is more relevant now than say 10 years ago?
W- Well I would assume so, like normal technology it develops over time so if it’s still around that means people are still using it so, that would make it relevant? As to 10 years ago I don’t really know sorry.