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Readability of Websites Security Privacy Policies: A Survey on Text Content and Readers

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Abstract

The aim of website's Privacy Policies is to educate consumers of a website's practices and procedures relating to their collection, usage, exchange, control, protection and the use of technology in relation to the information collection (website beacon and cookies) and transmission of user's personal information anytime he visits Internet website. This paper discusses a readability issues in privacy policies and how privacy scholars approach the issue. The paper also compares and analyzes research results on readability measurement of privacy policies and divides them into two categories according to different perspective. The perspective includes readability measurement from reader's perspective and readability measurement from privacy policies text content's perspective. Our finding shows that website providers should give consumers better control regarding their information and give them more freedom in privacy policies. Only then will consumers become liberated from the burden of choosing between 2 unspeakable options. A legally binding document on the privacy policy can be written, that will also be clear and simple to read.

Keywords: *Privacy, Readability, Privacy Policies, Security, Information privacy*

1. INTRODUCTION

The number of websites on the Internet has grown to more than a billion as of today (Stats, 2020). Approximately, more than ½ of the world's population access these websites daily. This has really brough about important changes in the way people interact with each other through these Internet services (Tesfay, Hofmann, Nakamura, Kiyomoto, & Serna, 2018). Such online interactions often lead to a huge amount of personal information traces that Internet providers are gathering and storing, with consumers quite often ignorant about the purpose of the collection. Ultimately, consumers will be left uncontrolled over their personal data, causing a massive imbalance of data as compared to Internet service providers who have full access to their information. In solving this imbalance, regulatory agencies have established enforcement standards and obligations for website providers with a view to protecting the consumer's rights to their data. Therefore, data protections or privacy policies have surfaced as the primary transparency boards used by Internet service providers to inform users' about their data processing practices (Tesfay et al., 2018).

This mechanism through which Internet website providers tell consumers how their data will be collected, secured, shared or otherwise managed is through privacy policies. They are expected to publish their privacy notices to inform users of their websites how they collect and use their personal data. From the context of major concern about user privacy, at least in theory, privacy policies are an important tool for communicating data management activities (Milne & Culnan, 2004). Privacy policies with better protections are proved to be more efficient than those with poor protections regarding the readiness of consumers to reveal their sensitive data (Peterson, Meinert, Criswell, & Crossland, 2007). Research consistently proved that these consumers read privacy policies in rare instances (Acquisti & Gross, 2006, Jensen, Potts, & Jensen, 2005) and they prepared to allow third party to access their data for marketing and other analytics since they didn't read privacy policies (Milne & Culnan, 2004). Many

research shows that privacy policies are largely overlooked simply because of their poor readability (Cadogan, 2004, Ermakova, Fabian, & Babina, 2015, Graber, D'alessandro, & Johnson-West, 2002, Mcdonald, Reeder, Kelley, & Cranor, 2009, Meiselwitz, 2013). An apparent understanding of the contents of privacy policies was discovered to guide consumers in reading the policy content with greater level of confidence in the policy (Milne & Culnan, 2004) and websites (Bansal & Zahedi, 2008a, Ermakova, Baumann, Fabian, & Krasnova, 2014; Ermakova, Krasnova, & Fabian, 2016). The possibility to inform Internet users about data-processing activities can be further compromised due to the difficult and ambiguous wording used in privacy policies (Reidenberg et al., 2015). It is similar to the area of usable security of warnings where technical jargons tend to make users in baffled to comprehend the message and making a decision (Zaaba 2014, Amran et al. 2017, Samsudin & Zaaba 2017a, Samsudin & Zaaba 2017b, Amran et al. 2018, Hussein et al. 2019). Clear and unambiguous understanding has also been noted as an important aspect of confidence towards the service providers (Bansal & Zahedi 2008a, 2008b, Ermakova et al. 2014, Ermakova et al. 2016, Ahmad et al. 2020, Yi et al. 2020). Reading privacy policies is not only difficult, but it's also time consuming which might result in economic loss. According to McDonald and Cranor, if a user were to read the privacy policies of any website he visits on the Internet, at least he requires an estimate of 244 hours per year, which is just over ½ the average time that a person would spend on the Internet by that time (McDonald & Cranor, 2008). It becomes more complex and time-consuming in the modern Internet access where the number of websites increases since almost multiplied and data is exchanged with 3rd parties who has various privacy policies (Cranor, 2012).

This paper is organised according to the following: Section 1 give a good theoretical perspective on privacy and readability of privacy policies in a general form. In section 2 we briefly discussed background of privacy and privacy policies. Then in section 3 we present the methodology used in this paper. In section 4 we discussed the findings, limitations, and directions for future work. Finally, Section 5 give the general conclusion for the paper.

2. PRIVACY AND PRIVACY POLICIES

Westin defines privacy as an ability of a person to determine when, how and to what level his or her personal data is disclosed to others (Westin, 1968) and also a rights and responsibilities of people and organizations on the collection, use, storage, dissemination and disposal of personal information. Some laws like Directive 95/46/EC of the EU Parliament and the Council (EPC, 1995) and fair Information Practice Principles (FIPP) of the Federal Trade Commission of the U.S. (FTC, 2000) addressed online privacy. They enforce that users have to be notified when their data is being collected, also they must be allowed to decide concerning the secondary use of their data (Bansal & Zahedi 2008b, Reidenberg et al. 2015, Xu, Teo, Tan, & Agarwal, 2012). According to Reidenberg et al. and Vail et al. privacy policies are the only means of telling consumers why and how the organization collects and manages their personal information and allowing users to determine if to comply with the policies and whether to communicate with the organization or not (Reidenberg et al. 2015, Vail, Earp, & Antón, 2008). The privacy policies are extremely difficult to read. Because of that, average users have difficulty understanding and interpreting them correctly. This create discrepancies among the perceptions of the users and the policy specified (Martin, 2015). In line with recent findings (Litman-Navarro, 2019) privacy policies have significantly increased in length, which make it more difficult for average users read. Most privacy policies from big tech and media platforms are verbose and full of legal jargon, and elegantly set the justifications for businesses to collect and sell your data (Litman-Navarro, 2019). The data industry has now become the internet driver, and we agree with these policies but not fully comprehend why the help accelerate it.

3. READABILITY

According to Klare readability as "the ease of understanding or comprehension due to the style of writing" (George Roger Klare, 1963). Harris and Hodges viewed readability as an association between two characters that include reader and text (Harris & Hodges, 1995). For the reader aspect, it covers the reader's knowledge, reading skills, interest, and motivation. Reidenberg et al. (2015) for instance, show

that experts, knowledgeable and typical users perceive privacy policies differently. While for the text, they include content, design, organization, and style (DuBay, 2007). Researchers assess readability of a text in two ways as differentiated by (George Roger Klare, 1963): It can either be measured by a reader's test (Bansal & Zahedi 2008a, 2008b, Cadogan, 2004, Ermakova et al. 2014, Fanguy, Kleen, & Soule, 2004, Mcdonald et al., 2009, Milne & Culnan, 2004, Proctor, Ali, & Vu, 2008, Singh, Sumeeth, & Miller, 2011, Sultan, Urban, Shankar, & Bart, 2003) or by text assessment such as syllables, words, and sentences (Anton et al. 2003, Cadogan, 2004, Ermakova et al., 2015, Graber et al. 2002, Jafar & Abdullat 2009, Jensen & Potts 2004, George R Klare 1974, McDonald & Cranor 2008, Meiselwitz 2013, Sunyaev, Dehling, Taylor, & Mandl, 2014).

3.1 Readability Measurements in Privacy Policies

In 1920s, the 1st readability formulas emerged, and by 1973 there were over 200 separate readability formulas (Fabian, Ermakova, & Lentz, 2017). According to Fabian et al. (2017) there is no any matric can be considered superior for analysing readability, we focus on the most proven one like Flesch Readability Ease Score (FRES) (Flesch, 1948), Laesbarhedsindex (LIX) (Anderson, 1983), New Dale Chall Score (NDC) (Dale and Chall, 1995), Flesh-Kincaid Grade Level (FKG) (Kincaid et al., 1975), Readability Index (RIX) (Anderson, 1983), Simple Measure of Gobbledygook (SMOG) (McLaughlin, 1969), Coleman-Liau Index (CLI) (Coleman and Liau, 1975), Gunning Fog Index (GFI) (Gunning, 1952), Automated Readability Index (ARI) (Senter and Smith, 1967) and Fry Readability Graph (Fry) (Fry, 1963) (Shedlosky-Shoemaker et al., 2008). Yet its ability to assess text readability is poor. Singh (2011) in his research criticized their underlying assumptions that shorter words and sentences are easier to understand than longer ones.

3.2 Readability Measurement from Reader's Perspective

Milne and Culnan (2004) used online survey of 2468 United State citizens who are Internet users to investigate why online users read privacy policies in a variety of situation and they found that reading privacy policies to be linked to privacy concerns, optimistic expectations about policy comprehension, and higher level of confidence in the policy and also reading privacy policies is only one element in an overall strategy users used to manage the risks of revealing their personal data on the Internet. But the study only focusses on financial websites and research did not consider other approaches such as controlled experimentation in order to understand the roles privacy policies play in consumer decision making. The number of participant and their geographical zone also need to be modified in order to cover different group of people. Ermakova et al. (2014) conducted online survey on 440 persons to examine the objective and subjective readability of privacy notices and to investigate their impact on user's trust in 5 big Internet services. Their result show that the more a consumer feels that she has satisfied with the privacy policies contents, the higher she trusts a website across all the companies that they have analyzed. There is need to be a greater number of websites and the participant also. Additionally, the domain of the study is mostly social networking websites, there is need to include other domains.

Bansal et al. (2008) study the balancing role that privacy concerns play on how privacy assurance cues and argument quality lead to increased confidence, and the resulting decision to share health information online. They found that dual functions of privacy policies contents, privacy assurance and trust cues. The result highlights the differential impacts that such mechanism has on websites users dealing with high privacy and low privacy in connection with the online disclosure of health data. The study conducted on college students; therefore, the results may not give the real information, there is need to include different group of people especially average Internet users. Aïmeur et al. (2016) conducted a survey with 717 participant and used empirical model to conduct an experimental comparative study of user trust by offering to 2 group of participants the possibility to adhere to a service with a privacy notice presented in 1 of 2 different format: the 1st is standard privacy notice and the 2nd developed according to the privacy policy model studied in their paper. They found that enabling consumers to

manage and customized their privacy policies enhances their confidence which makes online services seem more secure to consumers (Aïmeur, Lawani, & Dalkir, 2016).

Sumeeth, Singh, & Miller, (2010) examined if the presentation of privacy policies had effect on its readability and understanding. They found that respondents were unable to comprehend the privacy policies of organizations using any of the formats studied. They also reveal that about 20 percent of privacy policies needed an educational level close to a postgraduate level in order to help understand. Bansal et al. (2008b) investigates the balancing position of privacy concerns on how well the consistency of privacy policies statement and privacy assurance guidelines lead to increased confidence and the resulting decision to reveal personal data online. The result show distinct behavioral differences between how high vs low privacy concerns shape their willingness to share personal data through different contexts. But in order to provide a tailor-made set of indicators that enhance the impact of privacy policy statements, moderating the effect of personal privacy issues within different contexts is still required. Fanguy et al. (2004) tested the readability of 4 different companies' privacy policies, they use web-based information system to automate the Cloze test for readability. They found that a very small percentage of participants received scores that were enough to be regarded as able to read and understand the policies without any further assistance. There is need to validate this finding.

Table 1. Summary of privacy policies readability measurement by reader.

Author	Title	Method	Findings	Limitation
Milne and Culnan (2004)	Strategies for reducing online privacy risks: Why consumers read (or don't read) online privacy notice	Survey	They found that reading privacy policies is only one element in an overall strategy user used to manage the risks of revealing their personal data on the Internet	The study focuses only on financial websites and did not consider other approaches such as controlled experimentation in order to understand the roles privacy policies play in consumer decision making
Ermakova et al. (2014)	Privacy policies and users' trust: does readability matter?	Survey	The result show that the more a consumer feels that she has satisfied with the privacy policies contents, the higher she trusts a website across all the companies that they have analyzed	The number of participants is small to give the accurate result and also the study coverage is limited to social networking websites
Bansal et al. (2008)	Efficacy of privacy assurance mechanisms in the context of disclosing health information online	Lab observation	The result highlights the differential impacts that such mechanism has on websites users dealing with high privacy and low privacy in connection with the	The research should also investigate in other context, it may affect the behavior of the users. Also, the result may be investigating with other set of people.

			online disclosure of health data	
Proctor et al. (2008a)	Examining usability of web pribacy policies	Survey	They found that participant perceived longer privacy policies which included many privacy goals as giving better assurance of privacy than shorter policies that included fewer goals.	Better practices, such as visual privacy policies certification seals and having readable privacy policies that can assure people of privacy protection, are often lacking in the current policies
Aïmeur et al. (2016)	When changing the look of privacy policies affects user trust: An experimental study	Survey	They found that enabling consumers to manage and customized their privacy policies enhances their confidence which makes online services seem more secure to consumers	They did not implement the model they propose, they only show it to the users as lab work.
Bansal et al. (2008b)	The moderating influence of privacy concern on the efficacy of privacy assurance mechanisms for building trust: A multiple-context investigation	Survey	The result show distinct behavioral differences between how high vs low privacy concerns shape their willingness to share personal data through different contexts	In order to provide a tailor-made set of indicators that enhance the impact of privacy policy statements, moderating the effect of personal privacy issues within different contexts is still required
Fanguy et al. (2004)	Privacy policies: cloze test reveals readability concerns	Cloze Test	The result showed that a very small percentage of participants received scores that were enough to be regarded as able to read and understand the policies without any further assistance	There is need to validate the finding

3.3 Readability Measurement by Text Content

Anton et al. (2003) study the lack of clarity in 9 financial institutions. forty online privacy policies handled by the Gramm-Leach-Bliley Act (GLBA), which specifies that policies must be ' clear and conspicuous. ' The study uses two complimentary approaches to analyze the clarity of policies: goal-driven requirements engineering, and readability analysis of privacy policy statements based on proven metrics. Findings show that compliance with the GLBA's clear and conspicuous provision of the examined policies is at best uncertain and show that almost all policies need a significantly higher level of reading ability than the average level of literacy of the Internet users. Cadogan (2004) study and

evaluated the privacy policies of three organizations in terms of their readability and their usability. The 3 online organizations selected include PrivacyAlliance.org, Dell.com, and Amazon.com.
Ermakova et al. (2015) study the readability of privacy policies from more than 5000 health websites and 1000 e-commerce websites by designing and implementing an automated extraction and readability analysis toolset that can provide empirical evidence on readability. Their findings proved that current privacy policies still difficult to read. Additionally, the result shows that policies on health websites are more readable than those on top e-commerce, but policies on non-commercial health websites are less readable than commercial ones.

Sumeeth et al. (2010) examines if online privacy policies are understandable to the users of the Internet? This examination is undertaken by collecting privacy policies from the most popular websites on the Internet, and analyzing their readability using several readability measures. They found that the privacy policies are becoming more readable on average. Nevertheless, these policies are still beyond the capacities of a large section of Internet users, and nearly 20 percent of policies require a level of education approaching a postgraduate degree in order to promote comprehension. Graber et al. (2002) study the readability level of 80 Internet Health Web site privacy policies and determine whether such statements can inform users of their rights. Results from the surveyed-on Internet health websites, 30 percent (including 23 percent of commercial websites) did not have any privacy policy published. On average, the readability level of the remaining websites required two years of university-level education to be understood, and no website had a privacy policy that most English-speaking people in the United States could understand.

Jafar & Abdullat (2009) perform exploratory data analysis of historic readability trends as well as the reading standard of policy documents by Google, Yahoo, Myspace and Facebook. The result shows that except Yahoo.com, the existing policy document are written for web-users with a minimum of 2 years of college education. This is not the case for most of social networks users. Also, privacy policy documents can accomplish their goals and maintain a reading grade level of high school education or less. McDonald & Cranor (2008) measured the word count of the 75 most popular websites based on a list of 30,000 most frequently clicked-on websites from AOL search data in October 2005. They found that the policy document has a wide range of lengths from a low of just 144 words to a high of 7,669 words- approximately 15 pages. They also found that reading privacy policies cost approximately 201 hours per year, worth approximately $3,534 per American Internet user per year.

Meiselwitz (2013) examines the readability of 20 social networking websites privacy policies and measures the complexity of interpreting selected social network sites ' regular policies and procedures. They found that more than half of all sites (51 percent of the average scores) require a college level reading ability. In addition, looking on how many students register for social networks before they get to college, the grade level score is clearly beyond the reading capacity of many students at the time they sign up for a user account. Considering that privacy policies of all social networking sites are online and in HTML format, there is need for research community to significantly contribute to improve the situation of lengthy policies with high reading grade level requirements. Sunyaev et al (2014) study the readability, scope, and transparency of 600 most commonly mobile Health application privacy policies on iOS and Android smartphones. They found that only 183 (30.5 percent) had privacy policies. Those with privacy policies have 1755 words on average with reading grade level of 16. The available privacy policies do not give information on privacy practices to users, it require college-level literacy to understand, and are often not focused on the app itself.

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Table 2. Summary of privacy policies readability measurement by text content.

Author	Title	Method	Findings	Limitation
Anton et al. (2003)	The Lack of Clarity in Financial Privacy Policies and the Need for Standardization	FRES & FGL	Findings show that compliance with the GLBA's clear and conspicuous provision of the examined policies is at best uncertain and show that almost all policies need a significantly higher level of reading ability than the average level of literacy of the Internet users	The study focuses only on a single domain i.e. financial websites and did not consider other methods such LIX, SMOG, RIX, etc.
Cadogan (2004)	An imbalance of power: the readability of Internet privacy policies	FGL	The result show that the more a consumer feels that she has satisfied with the privacy policies contents, the higher she trusts a website across all the companies that they have analyzed	The number of participants is small to give the accurate result and the study coverage is limited to social networking websites
Ermakova et al. (2015)	Readability of Privacy Policies of Healthcare Websites	FRES, FKG, SMOG, LIX, RIX, ARI, NDC, GFI, CLI	They found that current privacy policies are still difficult to read, and policies on health websites are more user-friendly than those on e-commerce websites.	The study focuses only on two domain health and e-commerce, there is need to include other domains.
Sumeeth et al. (2010)	Are online privacy policies readable?	Internet	They found that privacy policies are becoming more readable on average and are still beyond the capacities of a large section of Internet users, and nearly 20 percent of policies require a level of education approaching a postgraduate degree in order to promote comprehension.	There is need apply many approaches
Graber et al. (2002)	Reading level of privacy policies on Internet health Web sites	Flesh, Fry, SMOG	Result shows that 30% of health websites and 23% of commercial websites do not have privacy policies, it requires a year 2 college student to read the policies.	The websites studied represent minority of health and commercial websites, therefore more website in different domains need to be consider.
Jafar & Abdullat (2009)	Exploratory analysis of the readability of information privacy statement	Flesch-Kinkaid, Gunning Fog and SMOG	The result shows that except Yahoo.com, the existing policy document are written for web-users with a minimum of 2 years	it is possible to write a legally binding privacy policy statement that is also

	of the primary social networks		of college education. This is not the case for most of social networks users	clear and easy to read and understand
McDonald & Cranor (2008)	The cost of reading privacy policies		They found that the policy document has a wide range of lengths from a low of just 144 words to a high of 7,669 words- approximately 15 pages. They also found that reading privacy policies cost approximately 201 hours per year, worth approximately $3,534 per American Internet user per year	The research is only conducted on American people, there is need to cover more people from other countries
Meiselwitz (2013)	Readability assessment of policies and procedures of social networking sites	FRES, FGL, FOG, SMOG, CL	They found that more than half of all sites (51 percent of the average scores) require a college level reading ability. Also, many students sign up new account before getting to the collage, which means they their account without reading the privacy policies.	Considering that privacy policies of all social networking sites are online and in HTML format, there is need for research community to significantly contribute to improve the situation of lengthy policies with high reading grade level requirements
Sunyaev et al. (2014)	Availability and quality of mobile health app privacy policies.	Survey	They found that only 183 (30.5 percent) had privacy policies. Those with privacy policies have 1755 words on average with reading grade level of 16. The available privacy policies do not give information on privacy practices to users, it require college-level literacy to understand, and are often not focused on the app itself.	There is need to address why privacy policies are often absent, hard to read and understand, opaque, or irrelevant.

4. DISCUSSION

We categorized the findings into 2: the studies that investigate readability measurement from reader's perspective in privacy policies, and the studies that investigate readability measurement of text content in privacy policies.

4.1 Readability measurement from reader's perspective

Result from Table 1 show that majority of the authored use survey method to investigate why online users read privacy policies, we also found that the more consumers feels that they trust privacy policies contents, the higher they trust the websites they visit most especially websites in healthcare domain. Also, in most of the survey conducted by researchers, participants believe that a privacy policy with longer and detailed contents with many goals, give them better assurance of their data processing than privacy policies with shorter contents and goals as reported by (Aïmeur et al., 2016). Consumers' willingness to share their personal data is related to the Internet service provider's freedom to users, (Ermakova et al., 2014) shows that allowing consumers to control and configure their privacy policies enhances their confidence which make online services seem more secure to them. Overall results prove that very small percentage of respondents can be able to read and understand the privacy policies without any assistance.

We observed some limitation from the study which include size and region of the participants in all the survey conducted, majority of the participant are from one region and their number is not enough to convincing result. Second limitation is that the method used in almost all the research is the same, they use survey to access the readability of the readers, there is need to try other methods for validating the result. Third limitation is lack of better practice regarding the collection, processing, storing and use of consumers data, there is need for better and transparent way of managing user's data.

4.2 Readability measurement by text content

Result from Table 2 show that many privacy policies contents use vague and ambiguous words, which make it difficult for average Internet users to comprehend (Ermakova et al., 2015). The contents of the privacy policies on websites is varies between one another, many of the papers reviewed show that two domains were the most dominant, this are health and e-commerce. Almost all website requires a consumer with a collage level reading ability to read and understand the content of privacy policy (Sunyaev et al., 2014).

The need to develop a usable privacy policy is one limitation that we observed from the literature, with the implementation of GDPR by the EU and other regulations by different agencies, there is need for the designers of the website to revisit there policy content in order to abide by the new regulations. Many privacy policies that were studied, they only cater the need of American or European people, there is need to include other regions for proper management.

5. CONCLUSION

We have conducted a literature survey on readability issues in privacy policies and see how researchers approaches the problem, and we investigated different findings. We suggest that style of writing, conceptual structure, design difficulties, textual features and user specific knowledge should be included in readability evaluations, particularly in relation to website environment. We recommend that privacy policies readability should be made more accessible to an average user because existing privacy policies seem to lack substantial profit towards consumers, information management, understanding, and protection of personal data.

Our finding shows that website providers should give consumers better control regarding their information and give them more freedom in privacy policies. Only then will consumers become liberated from the burden of choosing between 2 unspeakable options. Online privacy policies should achieve their goal of presenting clear and precise policy notice without complicating the content of policy statements with too many difficult words and sentences. A legally binding document on the privacy policy can be written, that will also be clear and simple to read. Although tracking strategies are becoming highly sophisticated in today's business industry professionals, there is also an alarming lack of Internet users' awareness about how businesses monitor their online activities and use the data

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