The Shrink-Wrap Dilemma

When We Don't Necessarily Agree with Agreements, But Agree to Them Anyway

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Abstract*—End user agreements with application providers are a required commitment for digital citizens – students, employees, customers and everyone else. Despite their proliferation and use by nearly every major multinational company, there exists a basic sanity check failure. These agreements are routinely agreed to with scant, if any, comprehension. This paper examines the current situation with quantification-based analysis, compares variations among countries and outlines possible solutions to bring more integrity to the "voluntary" agreements between end users and application providers. It introduces a Readability Gap measurement for describing the disparity between a populations' comprehension and the readability level of electronic agreements they routinely make.*

Index Terms — *netizen user agreements, NUA, readability gap, RG, end user agreements, EULA, shrink-wrap, terms of servie , TOS*

I. Introduction: NUAs are a part of life

Agreed to in countless quantities on a daily basis, boring yet dangerous, they are legally binding but flippantly agreed to. Netizen User Agreements (NUAs, pronounced *"new-ahs"*) are comprised primarily of End User License Agreements (EULAs) and Terms of Service (TOS). Both of these virtual impediments and or protections are similar to tangible shrink-wrap in the real world and will often be referred to as shrink-wrap throughout the text. These agreements are something that all owners and virtually all users of computing devices have agreed to. The pressing issue with NUAs is that they are being agreed to without being read or understood. This behavior is in turn the cause of escalating concerns, such as compromised security and legal rights. However, the root problem is still agreeing without comprehension of the agreement. Why is the overwhelming majority of the digital population engaging in this behavior and what can be done to solve problem?

II. The Digital Shrink-Wrap Wrap Problem

There are four aspects of the problem being addressed in this paper:

A. NUAs are long

B. NUAs are difficult to understand

C. Netizen agreement is practically obliged

D. Netizens agree to NUAs without reading them

A. NUA Length

The longer a document is, the more time it takes to read. In the case of agreements it can reasonably be assumed the length is also directly proportional to the number of terms being agreed to. Thus longer is worse and shorter is better from the user's standpoint. On the other hand, a longer document offers more information to the user and also enables the company to clarify exactly how the user will be treated and what the expectations and obligations for both parties are. In addition, a more complete agreement provides more protections for the company from possible eventualities.

A distribution of agreement lengths of 13 popular services and applications is shown in Figure 1. Each of these has a large user base, the aggregate number of agreements well into the billions. For comparison, Figure 1 also includes the Magna Charta text length as a reference.

The average length for this set is 6,095 words. Given the average adult reading speeds to be in the range of 200 to 300 words per minute, these lengths suggest that 20 to 30 minutes is required to read these NUAs on average. On the high end, the longest agreement (TurboTax) at over 14,934 words can take many people over 70 minutes to read at 200 words per minute. On the on low end, the shortest length (Gmail) of 2,257 words would require about 7.5 minutes at 300 words per minute.

But the time needed to read these NUAs is probably higher given several factors. First, it is interesting to note that reading speeds tend to be slower for on-screen reading than when printed on paper [1]. Secondly, since the goal of reading is comprehension, the time required will be longer because of the readability level of these texts, which is analyzed in the next section. Thus the expected readings times provided immediately above are suspect.

Having established that NUAs tend to be rather long, it should be pointed out that the use of long NUAs is at fundamental odds with the spirit and culture of the Internet, where speed, efficiency and simplicity of the human-machine interface are core values.

Can these agreements be more user-friendly? While the variability of the nature of the applications in Figure 1 is non-trivial, there are also many similarities. Thus it is interesting to observe that there is a significant range in word length, i.e. the longest is about four times the length of the shortest. Perhaps some agreements can be shorter, but more analysis is needed.

However, even the shortest is rather long for a modern digital experience.

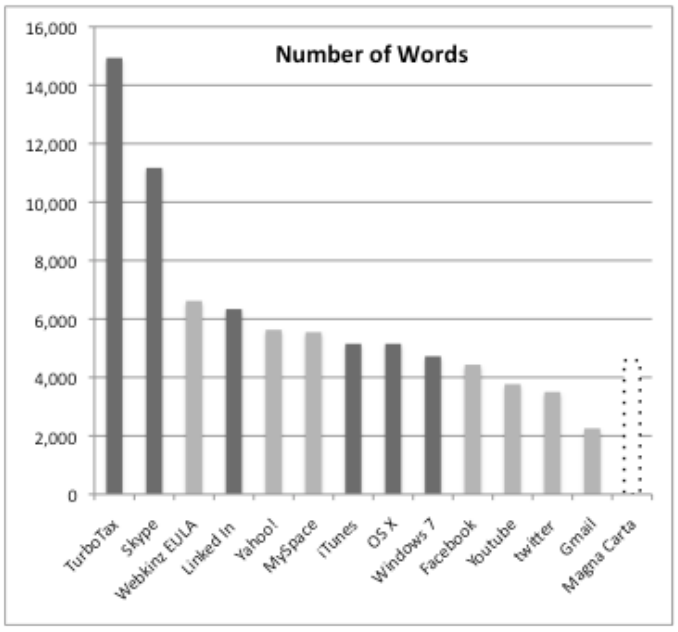

Figure 1. NUA Length – 13 Popular Applications and Services

B. NUAs Are Difficult to Understand

Readability Indexes

One virtually universal characteristic of NUAs is their technical legalese that makes reading and even comprehension difficult. Five different measures of reading levels were used to get a sense of the readability of these agreements. The first method applied is the Flesch-Kincaid Grade Level that translates a readability formula score that ranges from 0 to 100 into a US grade level [2]. The second method used is Gunning Fog Index, which provides an indication of the number of years of formal education that a person requires in order to easily understand the text on the first reading [3]. The third method used was the SMOG index, which is an enhancement to the Gunning Fog approach. The fourth method is the Coleman-Liau index, which seeks to gauge the understandability of text. The final method used was the Automated Readability Index (ARI). The first three methods are based on syllables and word complexity, whereas the latter are based on the number of characters.

Analysis of NUA Readability

Figure 2 provides a distribution of the reading difficulty for some of the world's most consented to NUAs with the five methods just described. There are three key observations to be made about this chart.

The first observation is that the **readability levels have a wide range**. The range of scores spans from a 7.4 to 19.9. The former being calculated for the nonprofit Mozilla Firefox and the later for the professional networking site LinkedIn. The 19.9 score means that this agreement requires a postgraduate level education (see Table I).

The second observation is that **the average agreement requires advanced education**. The arithmetic means for the five indexes ranged from 12.3 (Coleman-Liau) to 14.9 (Gunning Fog), all of which fall into the college level reading range (Table I).

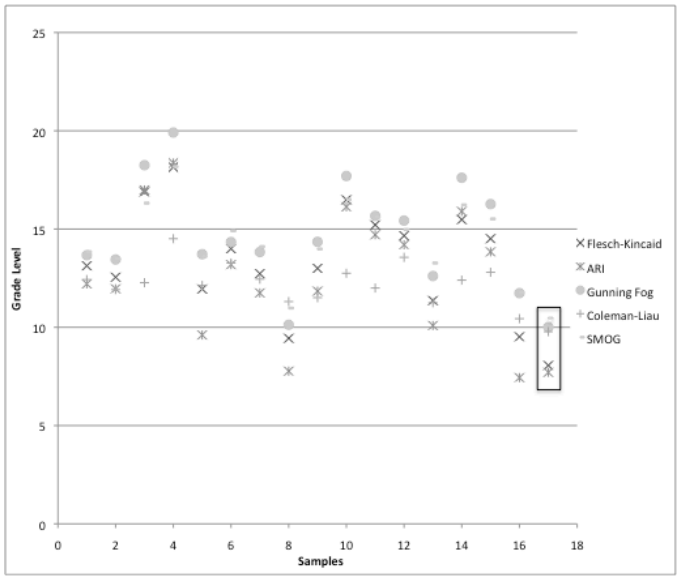

Figure 2. Readability Analysis of 16 Samples

The EULA and TOS samples, from left to right, are: TurboTax, Skype, Webkinz, LinkedIn, Yahoo!, MySpace, iTunes, Windows 7, Facebook, Youtube, Twitter, Gmail (Orkut), Xing, Cyworld, Legal Zoom and Firefox; in addition, the 7,146-word Obama State of the Union Address (2012) is provided as a reference.

The third observation is that these **readability levels are difficult for many** because they do not fit the demographics of a country's population. The typical reading levels for selected countries are presented in Table II. Note that this table is favorably biased toward higher levels of reading in that it includes a disproportionate number of economically advanced countries, and therefore, educationally advanced countries. For most countries, only a minority of the population has the reading skills necessary to understand most agreements. It is here observed that there is a fundamental problem with the reading level associated with most NUAs. The NUA readability difficulty problem can be understood more with the use of a Readability Gap measurement.

TABLE I. GRADE LEVEL REFERENCE

US Grade Level	Description
1 to 6	Elementary
>6 to 8	Junior High School
>8 to 12	High School
>12 to 16	College -Undergraduate
>16	University – Post Graduate

TABLE II. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) EDUCATION AT A GLANCE 2012 STATISTICS[1]

Population	Adult Population Education Level Attainment [%]	
	Secondary (High School)	**Tertiary (University)**
Argentina	28	14
Australia	31	37
Brazil	30	11
Canada	26	50
Indonesia	19	5
Russian Federation	34	54
Saudia Arabia	15	16
South Africa	23	5
United Kingdom	37	37
United States	47	40
OECD Average	44	30
EU21 Average	48	28
G20 Average	33	26

Readability Gap Measurement

In order to more precisely understand the actual readability problem, a measurement is here introduced to provide some quantification of the problem.

The difference between a sample comprehension measurement and the arithmetic mean of the population's actual education is introduced here as the *Readability Gap*, or RG, calculated in Equation 1.

$$RG = \left[\left(\frac{1}{N}\right)\sum_{i=1}^{N} F\left(NUA_i\right)\right] - \left[P_{mean}\right] \quad (1)$$

Where:

N = number of samples
NUA_i = the ith sample NUA
F(x) = a Readability Measurement for x
P_{mean} = average education grade level of population

The units for the RG measurement are years [yrs].

A low RG measurement is good, indicating that the NUAs are comprehensible to a greater part of the population. A high RG measurement is undesirable because it indicates that a large portion of the population will have significant difficulty in understanding the agreement.

Table III provides the calculated RG values for four sample populations using varying combinations of the five readability indexes discussed.

Key observations from Table III include the following. First, there is a wide range of possible RG values; from just 16 samples we have a range of 1.5 to 13.1 years. Second, there can be some incredibly high RG values – e.g., 13.1 years for Webkinz, which is a virtual reality website for "small children." Third, reductions in RG values require attention to both the NUA text and the user population education level.

TABLE III. SAMPLE RG CALCULATOINS

Entry	Description	Number of Samples, N	Average NUA Readability Index	Average Education Grade Level, P[2]	RG [yrs]
1	OECD Population, Flesch-Kincaid, Table 1 Samples	16	13.7	12.2	1.5
2	G20 Population, Gunning Fog, Table 1 Samples	16	14.9	10	4.9
3	OECD Population, Aggregate of 5 Readability Indexes for Skype	1	15.9	12.2	3.7
4	"Small Children",* Aggregate of 5 Readability Indexes, for Webkinz	1	16.1	3	13.1

*Webkinz website describes their site as being for "small children"; taken as 3rd grade here (8 years old) which is probably on the high side

C. Netizens Are Practically Obligated to Agree with NUAs

Paper contracts for banking, mortgages, purchases, employment, etc. have always been filled with pages of "fine print" requiring signatures and initials while the other people at the table wait impatiently. Thus people signing agreements not understand is nothing new.

But this precedent does not justify the dilemma's propagation. In fact, the problem's virtual presence is now its biggest expansion that necessitates a solution more than ever.

NUAs place users in the position of having to agree to a NUA so that they can use a product. While people are not forced to join social networking sites, download game software or use other examples of digital entertainment, there are many situations where doing so is not a pragmatic option. For example, for a traveling user who needs to work using the hotel Wi-Fi network or an employee who uses an assortment of software for his work, there is never really a choice as to whether they agree or not.

[1] www.oecd.org .

[2] Estimated calculation based on OECD statistics.

A person needs to have both the option to say 'yes' and 'no' in order for a real choice to exist [4]. A NUAs end user often has no recourse if he or she does not like any of the NUAs terms and 'no' is not a viable choice; these agreements are 'take it or leave it' propositions.

D. Netizens Agree to NUAs Without Reading Them

Virtually all users of computing devices are obliviously agreeing to shrink-wraps in order to shirk dense legalese. Though this behavior is understandable, users are still responsible for their acquiescence to many dangerous and compromising terms that can affect, or result in the loss of, basic legal rights, security, or speech freedom. In one case, a user had agreed to a clause in a EULA granting a company rights to "unused computing power and storage space" of his computers (PC Invaders) [5]. An additional case includes a Windows XP clause that granted Microsoft the right to download software on user's computers on behalf of third parties known as "Secure Content Owners" [6]. Another was a McAfee EULA that stated "The customer shall not disclose the results of any benchmark test to any third party without Network Associates' prior written approval" [7]. The first example compromises security while the second attacks speech freedom and a competitive marketplace. The Third restricts legal rights.

Additional restrictions that EULAs may place on a user are talking about the product, taking the product apart to examine it, and removing the product from your computer. Some major EULAs have you agree to future changes in the agreements without your consent. It seems as if they know few are reading these agreements! For example, the iTunes' EULA stipulates:

> **Apple reserves the right, at any time and from time to time, to update, revise, supplement, and otherwise modify this Agreement and to impose new or additional rules, policies, terms, or conditions on your use of the Service. Such updates, revisions, supplements, modifications, and additional rules, policies, terms, and conditions (collectively referred to in this Agreement as "Additional Terms") will be effective immediately and incorporated into this Agreement. Your continued use of the iTunes Music Store following will be deemed to constitute your acceptance of any and all such Additional Terms. All Additional Terms are hereby incorporated into this Agreement by this reference.**

Simply put, your continued use constitutes your agreement with all future EULA modifications.

III. Extent of the Problem

NUAs were first implemented in the mid-1980's when the increased use of software incentivized suppliers to come up with new ways to prevent downstream distribution of their products. They also sought to prevent the reverse engineering of their software that could allow rival companies to make knockoffs of their innovation. One of the reasons that digital shrink-wraps have become so large is that they are now used to protect from such a large and growing number of risks.

Fast-forwarding to today, there are now billions of NUA agreements in effect – with very few agreements having taken place with any actual reading or understanding. As the world braces for the next billion netizens to connect, many of whom will have relatively even lower levels of education, the Readability Gap will continue to grow unless new initiatives are taken to improve the situation.

One of the most effective tools for solving almost any problem is education. All users of computers should know how to approach and deal with shrink-wrap and browser wrap as well as their dangers. This could even take the form of a section in a required computer usage digital citizenship class for students in junior high. Another solution is to honestly condense the complex legalese into clear and simple terms that a reasonably low grade level would be able to comprehend. A balance must be found where companies still get full protection while users can quickly and easily understand what they are signing up to.

Yet another tool to help solve the current NUA situation is a method of customizing the extent of agreement. Instead of putting users in a 'yes' or 'not being able to use the product' position, implementing this option would give feedback and allow users to say "Yes, but." This would give NUAs more of a the feel of an agreement rather than a compulsion.

IV. Conclusion

This paper has introduced the term of Netizen User Agreements. It then presented data that demonstrated that NUAs are too long, not aligned with the culture of the Internet, and difficult to understand. This is problematic. A Readability Gap measurement was introduced to quantify the disparity between netizen populations' reading skills and NUA readability. These RG values indicated that often it is only a minority of a population that is able to understand the agreements being made. The paper then proceeded to analyze netizen behavior and found that agreements are often made under obligation.

Because billions of these agreements are already in force and billions more are yet expected it is long overdue for improvements to be made. Measures of success will be dramatically shorter times to read – perhaps under a minute, simpler language for all – meaning the RG value is driven to less than 0, and hidden terms are purged – those that compromise your dignity, security or common law rights.

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REFERENCES

[1] Ziefle, M. (1998), “Effects of display resolution on visual performance, Human Factors”, 40(4), 555–568.

[2] Kincaid JP, Fishburne RP Jr, Rogers RL, Chissom BS (1975). "Derivation of new readability formulas (Automated Readability Index, Fog Count and Flesch Reading Ease Formula) for Navy enlisted personnel]". Research Branch Report 8-75, Millington, TN: Naval Technical Training, U. S. Naval Air Station, Memphis, TN.

[3] Gunning, R. (1952). The technique of clear writing. New York, NY: McGraw-Hill International Book Co.

[4] Os Guinness, remarks on American Freedom and Liberty.

[5] Borland, John and Konrad, Rachel, “PC Invaders,” CNET News. 2002.

[6] download.microsoft.com

[7] Newitz, Annalee, “Dangerous Terms: A User’s Guide to EULAs,” Electronic Freedom Foundation (EFF), 2005.

[8] Windows XP EULA .

[9] iTunes EULA .