Promoting Readability in EIA – Impacts of Regulation, Guidance & Certification

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Abstract

The laypersons ability to understand Environmental Impact Assessment (EIA) documents is essential to environmental protection. The public nature of these documents provides the checks and balances for assessment quality and enables the democratic voice. Thus, safeguarding plain language in EIA Non-Technical Summaries (NTS) is appropriate. Instruments designed to enhance the readability of EIA documents include regulations, guidance, and certification schemes.

To test the plain language of environmental assessment documents, we asked: Which instruments designed to increase readability have delivered the most readable impact assessment documents? Using the Flesch Reading Ease Scale, we calculated the readability score for 198 EIA NTS documents. The sample documents span three languages (English, German, Spanish) and originate from eleven countries (Bangladesh, Egypt, India, Lebanon, Vietnam, Austria, the U.S.A, Germany, United Kingdom, Peru, South Africa). The results compare the effectiveness of three types of instruments (regulation, guidance, certification) against a control group.

The results suggest more complex drivers for readability than the instruments explain. Regulators must take these results in hand to develop more coherent instruments to overcome barriers and promote benefits for effective readability. This paper outlines five recommendations to improve practice.

Introduction

Readability is the ease of reading to understand, keeping in mind both the context and the reader (Pikulski 2002). What is readable to an academic might not be readable to others. An adult without tertiary education is accustomed to simpler text. Barrier-free language simplifies language for people with disabilities, learning difficulties or reading in a second language (Grimm et al. 2018). As a simple measure of readability, a Flesch score of 60 is appropriate for a public audience (Flesch n.d.). That is the reading level at 8th grade in school. A large proportion of the population can't understand text above this level (Kutner et al. 2005).

Environmental Impact Assessments, also known as EIA, are designed to be read by the public (Schudson 2015). Public access to information is the binding force of the EIA. It is the mechanism that holds regulators and private interests accountable. Our environment is a public good, and when someone abuses it, it feels unfair to the rest of us who are disadvantaged (Ostrom 2010).

Public access allows people to understand the EIA, and comment on it. The knowledge gap between decision-making experts and the public is the expertise barrier (Hourdequin et al. 2012; Parthasarathy 2010). Poor information is a barrier to successful EIA because it makes "questioning experts difficult" (Wiklund 2011; Hartley & Wood 2005).

Public access is not guaranteed if the EIA is rendered inaccessible by poor readability. A report with poor readability is a superficial or "token" gesture (Odparlik & Köppel 2013). Decision-makers may turn a blind eye due to perceived incentives or barriers (Arnstein 1969; Eckerd 2016; Garard 2019; Hartley & Wood 2005).

How can the public be expected to trust the EIA process? Access to high quality information enables environmental justice (Dreher 2016; Retief et al. 2019). It increases

public participation (Hadden 1981). Readability also engenders positive emotions of ease and trust in the public (Baker 2011).

Apart from that, clear communication helps regulators to make better decisions (Möller-Lindenhof 2018). Which is surely one of the highest goals of the EIA process.

The inclusion of a non-technical summary (NTS) provides a section of the document specifically for a public audience. The NTS, or executive summary, is intended to be a brief overview of all the information relevant to the decision, in simple and easy to read language (IEMA 2012).

Prior research has established that EIA are actually extremely difficult to read and understand (Gallagher & Jacobson 1993; Sullivan et al. 1996; Fry et al. 2014 cited: Maxwell 2004, Apere 2005; Möller-Lindenhof 2018). For example, as early as 1996 it was found that reader's understanding of EIA material was "atrocious" and far from adequate (Sullivan et al. 1996).

Due to the importance of EIA readability three instruments have been used to improve it: regulation, guidance and certification (see Table 1). For instance, regulation in the United States requires EIA to be written in plain language. Regulation is the strongest instrument because it ensures adherence to due process (Zain et al. 2019). Access to legal recourse is available, among other reasons, when the EIA writer fails to write the assessments sufficiently well in accordance with the law (Schudson 2015). Guidance is a softer instrument that explains how to write more readable EIA documents. For example, the German government provides guidance on EIA readability. In rare cases countries might offer voluntary certification schemes. For instance, Fischer and Fothergill (2014) analysed the compliance results for the IEMA EIA Quality mark, a voluntary certification scheme in the UK.

No studies have compared the effectiveness of regulation and guidance at improving readability. We consider there to be an information gap around the effectiveness of EIA readability instruments that we aim to fill. This study compares EIA NTS for readability differences resulting from the introduction of readability instruments (regulation, guidance, and certification) in comparison to the control group.

Methodology

Using the Flesch Reading Ease Scale, we calculated the readability score for 198 EIA NTS documents. The sample documents span three languages (English, German, Spanish) and originate from eleven countries (Bangladesh, Egypt, India, Lebanon, Vietnam, Austria, the U.S., Germany, United Kingdom, Peru, South Africa). The results compare the effectiveness of three types of instruments (regulation, guidance, certification) against a control group.

In order to determine if any best practice instrument exists we analyzed archived reports with Student's t-tests. This allows us to study the prevalence of EIA readability in relation to different conditions (Yin 2014). Convenience non-probability sampling was chosen for easy accessibility (Etikan et al. 2016). We apply unpaired Student's t-Test to compare the readability scores. We set $\alpha = 0.05$ as significance level. We removed extreme outliers. Values above Q3 + 3xIQR or below Q1 - 3xIQR are considered as extreme outliers. Q1 and Q3 are the first and third quartile, respectively. IQR is the interquartile range (IQR = Q3 - Q1).

The countries with their respective instruments are included in Table 1. Where a country has an instrument we used the publish date of EIA to split the samples into 'before' and 'after' the introduction of the instrument.

Tab. 1: Sample groupings according to the referenced instrument (date of issue included) and country

	Control group	Regulation	Guidance	Certification
Egypt	Control group			
Bangladesh	Control group			
India	Control group			
Vietnam	Control group			
Lebanon	Control group			
Austria		Bundesgesetz über den Zugang zu Informationen über die Umwelt (Umweltinformationsgesetz - UIG), July 1993		
Germany		Gesetz über die Umweltverträglichkeitsprüfung (UVPG), Feburary 1990	Lesefreundliche Dokumente in Umweltprüfungen, Umweltbundesamt, September 2018	
USA		NEPA, January 1970 (Code of Federal Regulation, title 40, part 1502 for Environmental Impact Statements) & Plain Writing Act, October 2010	EIA Writing Style Guide, U.S. Energy Information Administration, April 2015	
Peru		Supreme Decree No. 019-2009-MINAM approving the Regulation of Law No. 27446, Law of the National System of Environmental Impact Assessment, January 2009	Guías para la presentación del Resumen Ejecutivo del EIA-d, May 2017	
South Africa	Control group		'Integrated Environmental Management Information Series' issue no. 15: 'Environmental Impact Reporting', 2004	
United Kingdom	Control group		Guidance, Environmental Impact Assessment, UK government, March 2014	IEMA EIA Quality Mark, April 2011

We use the Flesch score in this study. Extensive research has found the validity of readability scores as the "best predictors of text difficulty" (Dubay 2004 p35). The Flesch score, or reading ease scale, measures the words per sentence and syllables per word to calculate readability ratings, between 0 (hard) and 100 (easy) (Flesch 1948). The minimum score for public readability is 60. The Flesch score has been adapted and tested on several languages such as Spanish (Fernández Huerta 1959) and German (Amstad 1978). This tool is highly accessible and free making the formula inexpensive to use (Stone & Parker 2013). The online calculators used to analyze the text were: English: WebFX (1995), Spanish: Legible (2017) and German: Schreiblabor (Strecker 2009).

The sample size of 10 NTS reports per group was selected for robust statistical results. Countries that compare between instruments therefore had multiples of 10 EIA NTS.

To calculate the readability of our case studies with the Flesch score, we based our sampling method on Möller-Lindenhof's (2018) master's thesis. 250 words each were chosen at regular intervals. Samples were taken every two pages. Ten samples were taken from NTS that exceed 20 pages. Before calculating the Flesch score the samples had to be cleared of punctuation marks that were not full stops (Möller-Lindenhof 2018).

Results

We asked: are there any significant readability differences resulting from readability instruments (regulation, guidance, and certification) in comparison to the control group?

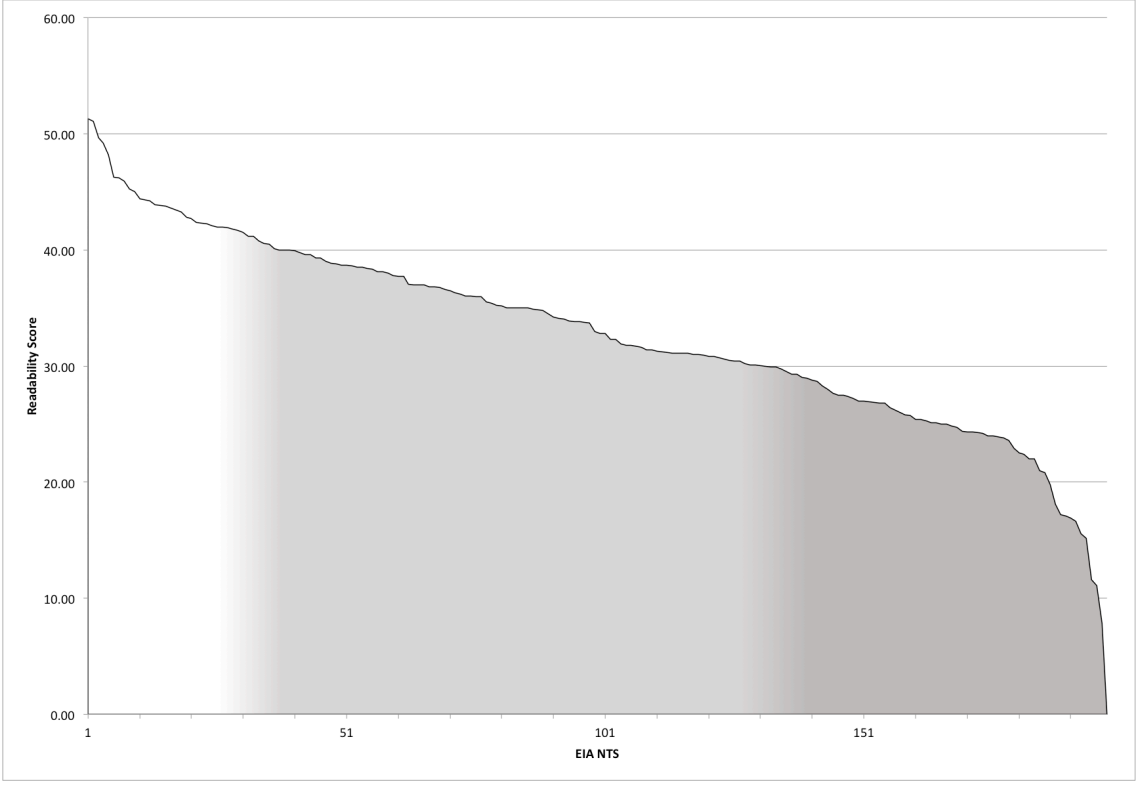

Fig. 1: Graph of Flesch readability scores for 198 EIA NTS

Of the 198 samples, four were excluded as extreme outliers and erroneous samples (USA Guidance US24, Austria Regulation AU07 & AU08, Germany Regulation GER05). The average readability score after removing outliers is 33, indicating it is "difficult" to read. Before excluding the samples, there was no significant difference between the instruments. With samples excluded, however, the difference between the regulation group and the control group is significant. The regulation group average is 34.7 points.

The Peruvian regulation group differs significantly from the control group. The scores for Spanish and the other two languages are significantly different. The Flesch calculators may be responsible. It's possible that a direct comparison of Spanish and other languages is erroneous. More research would be required to confirm this. We compared the instruments without the influence of Spanish samples. Without Spanish samples there is no significant difference between the regulation and control groups.

There is a significant difference between regulation and guidance in Germany, with regulation higher than guidance. In Austria the regulation group is significant different to the control group.

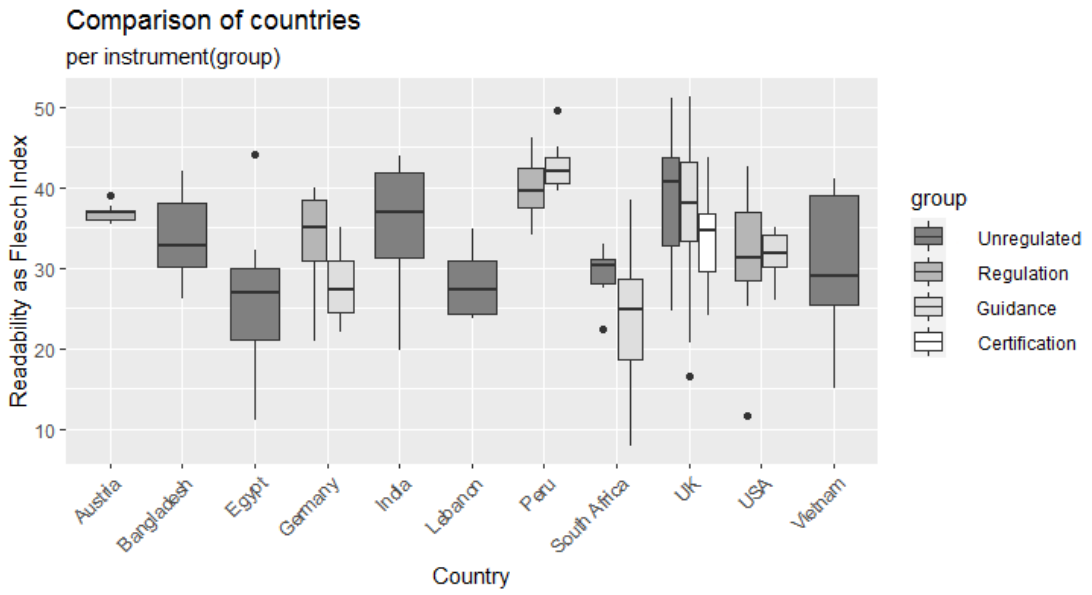

Fig. 2: Average readability scores by groups (See groups listed in Table 1)

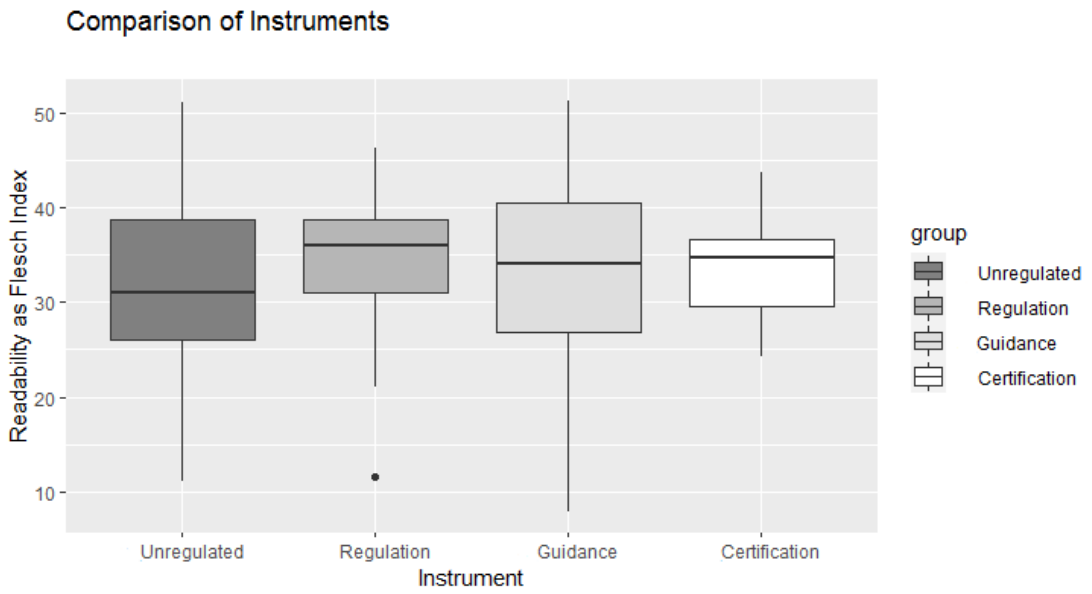

Fig. 3: Comparison of instruments (Control group, Regulation, Guidance, Certification)

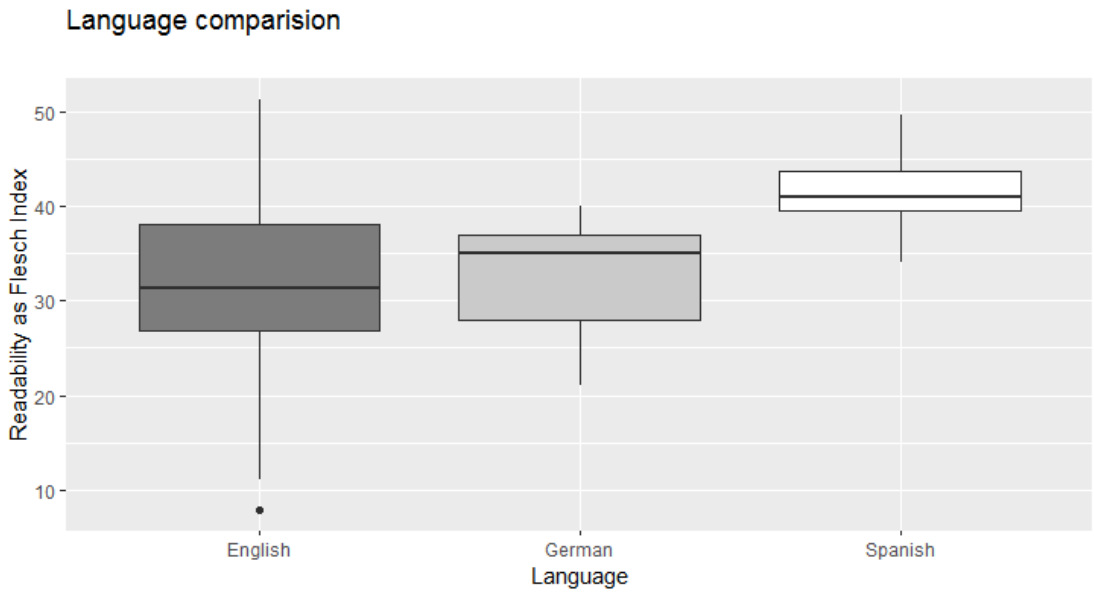

Fig. 4: Comparison of languages (English, German, Spanish)

Discussion

The results show that regulation may have helped improve readability marginally. However the readability of EIA non-technical summaries remains below the minimum required for a public audience. Our findings are well substantiated by prior research that finds the readability of EIA NTS is low. It is therefore not unexpected that the instruments are not effective at raising readability to a Flesch score of 60.

It is possible that limitations may have influenced the results obtained. A group of 21 students took the sampling according to the methodology. Using three languages introduces variance between the calculators. We had to exclude Spanish to test the affect on our results. There may be a time lag between implementation of an instrument and effective results. Notwithstanding, we believe that the studied readability-instruments have not yet been effective at increasing readability to suitable levels for a public audience.

The questions remains, why have instruments of regulation, guidance and certification not yet been effective? We propose barriers and benefits as likely reasons. Then we briefly review each readability instrument for specific insights.

Barriers: Organizational conflicts or goal conflicts are common problems when implementing environmental instruments (Young 2002) and when implementing readability in the health sector (Gal & Prigat 2004 p489). When there are benefits to poor readability, it is a conflicting goal in the pursuit of readability. Underlying drivers of complex writing should be considered, such as deliberate obfuscation (Merkl-Davies & Brennan 2007; Courtis 2004). We recommend addressing the goal conflicts, such as unintended benefits of poor readability.

Benefits: Regulators can benefit from readability. It is documented that decision makers are seeking clearer, easier-to-process documents (AASHTO 2006). Environmental agencies can't handle the increasing number of applications (Fonseca & Rodrigues 2017). Readability could help regulators handle high workloads.

Regulation: Stronger enforcement of readability may be necessary (Young 2011). Legal recourse is available under existing EU Law and the NEPA. In Oregon Environmental Council v. Kunzman (1987), residents won because the report was not written "in plain-language" (Stec 2003). This is a rare occurrence. In EIA cases, readability is not often taken before the courts. A mandatory minimum readability score could strengthen the legal case.

Guidance and Certification: Guidance provides writers with simple and good advice to improve readability (Grimm et al. 2018). However, guidance may not be easy to follow as it takes concentration and time, when interest and incentives to engage with it are low. Certification also attempts to explain to the writer how to achieve readability (IEMA 2004). Both are likely to be improved by providing high quality training.

Conclusion

Prior research has repeatedly established that EIA NTS are extremely difficult to read and understand. Although readability is clearly important in EIA, there is a lack of research on the effectiveness of instruments to improve EIA readability. Our research has aimed to fill this gap. We asked: are there any significant readability differences resulting from readability instruments (regulation, guidance, and certification) in comparison to the control group?

This research demonstrates that existing EIA readability instruments are not yet effective enough. We found the average readability score was 33 points, which is "difficult" to read. Regulation performed better than any other of the instruments but remained “difficult” to read.

EIA readability is critical for a variety of reasons. Readability provides clear information to decision makers, allowing them to make effective decisions. Public accessibility and participation is the foundation of effective EIA. For the public EIA must be readable.

Action needs to be taken on this critical issue. This research provides many opportunities to improve best practice EIA readability instruments. We make the following recommendations to practitioners in the field.

- Address the goal conflicts between each actor involved in EIA.
- Align the interests and incentives of each actor involved in EIA.
- Include a minimum readability score within regulation.
- Enforce regulatory consequences for readability and the capacity to take readability before the courts.
- Establish training and education programs to support practitioners implement guidance and certification.

The foundations of EIA need to be strengthened with more effective readability instruments.

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Instruments - Regulation, Guidance, Certification (As seen in Table 1)

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