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Taylor and Francis Journals Under the Critical Lens of Readability Analysis

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Abstract

Academic journals are channels through which research findings are presented. They are said to be the most potent means of communication in the academic community; hence, they must be as readable as possible. This paper evaluated the readability of the topmost 11 journals published by the Taylor and Francis group. Purposive sampling technique was used to select the 11 journals used for the study. Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL) indexes were used to compute the readability scores. Measures of central tendencies, one sample (with bootstrapping) T-test, and bar graph (with standard error bars) were used for data analysis. The results showed that they are practically unreadable when compared to the standard readability score.

Key Words: Readability, Research Article, Academic Communication, Taylor & Francis, Flesch Reading Ease, Flesch-Kincaid Grade Level

Introduction

An academic journal is a periodical publication in which scholarship relating to a particular academic discipline is published (Blake & Bly, 2000). Academic journals are channels through which findings of new researches are presented, and also offer the

opportunity for critiquing existing research works. Academic journals gain credibility through peer-reviewing. This implies that the articles are checked and examined by experts in that field of study (EBSCO, n.d.). Subject matter of academic journals typically comes in the form of articles presenting original research, review articles, and book reviews, with the purpose of imparting knowledge to individuals in the academic community.

Journal formats vary in different ways. Regardless of the variations, all journals contain certain rhetorical sections with standard information. The standard rhetorical sections include abstract, introduction, literature review, methodology, results and discussions, and conclusion. Each of these aspects of an article in a journal plays a unique role. Among all, the abstract seems to be the most important portion of a research article for the several reasons (Andrade, 2011). When readers search through electronic databases (e.g. Taylor and Francis), the abstracts are the only portions that they can have access to, prior to purchasing the article. In fact, the decision to purchase an article of a journal depends on how well the abstract presents the main ideas of the entire research paper. If the abstract is readable and understandable, then the paper is also likely to be purchased. What is more, most readers will concur that they are just prone to read the abstract instead of the whole paper, if a research report intrigues them. Generally, it is only when a reader has unique motivation for utilizing the paper such as replicating the research that the reader is probably going to read the whole article. Therefore, for most readers and even referees, reading an abstract is equivalent to reading the entire research paper.

There are a number of requirements for a good abstract. For instance, an abstract must be adequately illustrative of the paper if the paper is to be perused as stand-alone. It must be exhaustive, however, it is expected that the abstract remains within the word tally restraint indicated by the journal to which the abstract is to be submitted. These are technical requirements of a good abstract. Yet, the abstract will be of little interest (and value) if it is too difficult to read. Hence, in addition to all the above-mentioned requirements of a good abstract, it must be readable, and understandable.

Since journals are open to all academicians, several journals have been established for authors from different backgrounds to have their research findings published in them. That is, a journal has a diversity of authors, suggesting different readability levels for different portions of the same journal. While some of the authors are native speakers of the language in which the journal is published, others are not. Earlier studies (e.g. Hedl, Glazer-Waldman, Parker, & Hopkins, 1991) have indicated that the background of an article's author influences the readability of the paper. For example, one study found that manuscripts written by an author whose first language is English had a significantly poor readability, on the average, than those written by an author who used

English as a foreign language (Hayden, 2008). Hence, the readability of any journal must be evaluated to inform policy making on manuscripts presented.

Over the years, several authors have evaluated the readability of several journals. Different authors have focused on different journals. The fields of study that have been evaluated include the Humanities (e.g. Dolnicar & Chapple, 2014), Science and Medicine (e.g. Severance & Cohen, 2015), Business (e.g. Lee & French, 2011), and Education (e.g. Shelley & Schuh, 2001). All these studies concluded that research articles are generally difficult to comprehend when measured in terms of readability formulas.

In addition, different methodological approaches have been used by different authors. While some have considered whole journals (including each issue), others have used few selected articles of the journal. The limitation to the latter approach is that since different authors have different writing styles, a bias resulting from the selection of articles within a journal could easily affect the conclusions drawn. For the former, it is often tedious gathering readability scores for each article within a whole journal. Therefore, authors who used that approach have often times focused on just a single journal per time. Moreover, some scholars assert that journals that are considered to have high credibility and popularity have low readability Dolnicar & Chapple(2014). Such scholars; therefore, draw a relationship between the credibility and popularity of a journal on one hand and the readability of a journal on the other hand. The popularity of a journal is often measured by the number of times it has been cited in other peoples' works. Therefore, a more comprehensive approach to measuring the readability of journals should hang on two criteria:

1. include each article of each issue of that journal.
2. the popularity of the journal (measured by citations) since it will have a larger negative effect.

Although Shelley & Schuh (2001) have made an attempt to apply these criteria in the field of education, their methodology has some limitations. Three portions of the text of approximately 100 words apiece, were chosen from the beginning, middle, and end of each selected journal issue by these authors. Since each issue of a journal could contain quite a number of articles, a 100-word sample per each issue is woefully inadequate to represent the entire issues of each journal. This is particularly the case since each article of an issue could contain well over 5000 words (assuming that each article is 600 words long per page and 10 pages in all). Their approach probably introduced bias into the readability scores computed for each journal and probably affected the results and conclusions drawn. A better approach is to select, say 100 words, from the beginning, middle, and end of each selected article per issue per journal.

Interestingly, the abstract of each article provides insight into each portion (introduction & literature review, methodology, results & discussion, and conclusions) of the entire article. Hence, using the abstract of each article could be a more effective approach. In addition, since the journals used in the work of Shelley & Schuh (2001) were purposively selected to include different areas of specialty, it implies that journals of little impact could also be selected. This would limit the usefulness of the findings of Shelley & Schuh, (2001). In fact, Shelley & Schuh (2001) themselves acknowledged this shortfall of their approach (p. 18). Paralleling this study, Garcí a-Merino & Santos-a'Lvarez, (2009) adopted the approach described above. Unfortunately, their work is quite silent on their approach to selection of texts from the journal for the readability analysis.

In order to mitigate the limitations of the approaches of these different authors, a new (and I supposed, better) approach has been adopted in this paper. First, the abstract of each article of each issue of each journal were used for computing the readability scores. This ensured enough representation of each article. It also provided a standardisation for comparison of articles. Second, the 11 top most cited journals of Taylor & Francis publishing were employed in this study. Hence, the findings will have much larger appeal since these journals are cited very often. A justification for the selection of journals published by Taylor & Francis is given further attention in the literature review. There has not been a similar study such as was conducted by Shelley & Schuh (2001) within the field of Humanities. Hence, this paper is determined to fill in these gaps by considering the following research questions:

1. How readable are the 11 topmost journals of Taylor & Francis publishing group?
2. What is the trend in readability of research articles of the 11 topmost journals of Taylor and Francis Publishing Group considering the issue number?
3. Are there significant differences in the readability across the 11 topmost journals of Taylor and Francis Publishing Group?

Before these research questions are addressed, a brief review of readability and related indexes are presented. In addition, an overview of the Taylor & Francis publishing group has been discussed to give context to the results.

Review of Related Literature

What Readability and Readability Indexes Are

Hargis et al. (1998) focused on readability as an attribute of clarity. Dale and Chall (1949) defined readability as 'the total sum of all those elements within a given piece of printed material that affects the success a group of readers have with it. The success

is the extent to which they understand it, read it at an optimal speed, and find it interesting.’

Different methodological approaches have been used to measure readability. The most common is the use of readability indexes (formulas) Bailin & Grafstein, (2016). They described readability formulas as mathematical equations derived by regression analysis in which a model or equation that best predicts the reading grade level of readers who comprehend a given text is constructed. There have been about 200 readability formulas since the 1980s (Gazni, 2011). These formulas aim at computing the difficulty level of a text. Over a thousand studies have been published on readability formulas and they affirm their strong theoretical and statistical validity by the 1980s. However, considerable debate still exists regarding the validity of readability scores and their limitations. Hence, some researchers have offered alternative formulas, such as the usability test, but alternative formulas fail to do what the readability formulas do: providing an objective prediction of text difficulty (Hargis et al., 1998). However, it is noted that the readability formulas ignore the readers’ prior knowledge and motivation (Armstrong, 1988).

While more than 200 readability formulas exist to assess the readability of texts, some are favoured by researchers and commentators. These include the Dale–Chall formula, the Flesch formula, the Flesch–Kincaid formula, the Fog formula and the Cloze procedure (Stevens, Stevens & Stevens, 1992). Although other readability indexes are not so much popular and used by researchers, these seemingly unknown indices have used different approaches of measurement. These include the automatic readability index (ARI), Coleman-Liau index, among others. These formulas use other features of sentence such as number of characters per word instead of syllable per word. Readability formulas have grown in popularity because, unlike comprehension tests or subjective scoring techniques, no reader participation is necessary (Subramanian et al., 1993). This can lessen any potential validity threats resulting from selection and makes replication possible.

To provide a balanced view of readability formulas, a critique of such formulas are important. Bailin & Grafstein, (2016) have contended that counts of formal properties do not translate into units of reading difficulty. According to them, if one text has an average sentence length of ten words and another of fifteen words, this does not correlate to a difference of some function of five units’ difference of difficulty. The same point can be made about all counts of formal syntactic properties. Their conclusion is that if the individual variables that constitute the readability formulas cannot be considered meaningful factors in readability, then how can we consider the formulas themselves to be meaningful measures? Nevertheless, Chall and Dale (1995) considered the formulas good enough for practical purposes to estimate the reading level of any text, justifying the use of these indexes in this paper.

Readability of Abstracts of Research Articles

In the Humanities, Dolnicar & Chapple (2014) evaluated the readability of research articles in tourism journals using abstracts from full-length original articles published in the *Annals of Tourism Research*, *Tourism Management*, and the *Journal of Travel Research*. Thinking that the readability of research articles should improve over time due to improved review process, articles published at three points in time were chosen 20 years before the research (i.e. 1993), ten years before the research (i.e. 2003) and at the time of undertaking the study (2013). Using Flesch's readability index, the authors found that the average Flesch scores for the three journals were similar, ranging from 17 to 19, indicating that the three tourism journals are very difficult to read. Only three articles were found to be fairly easy to read, while 75 articles were difficult and 372 articles were very difficult to read.

Similarly, Hartley, Pennebaker, & Fox, (2003) analysed the readability of the abstracts of 80 research articles that were published between 1997 and 2001 from the *Journal of Educational Psychology*. The results showed that the abstracts were difficult to read. In addition, Gazni (2011) examined the abstracts of articles of the five most cited institutions in the world (Harvard University, Johns Hopkins University, Stanford University and Washington University as well as the Max Planck Institute) to determine their text readability levels. Using Flesch Reading Ease (FRE) index, his results showed that the mean FRE scores across the institutions ranged between 15 and 19, implying that the abstracts were all very difficult to read which is parallel to the study of Gazni (2011). Severance & Cohen (2015) measured how the readability of abstracts of research articles of *Medical Research Journals* changed from 1960 to 2010. Employing the Coleman-Liau Index (CLI) readability score, the mean CLI score across all the years was between 16 and 17. This suggested that all the abstracts were very difficult to read. It is apparent from the review of these papers that in almost all cases, the abstracts have been difficult to read for most readers.

Overview of Taylor & Francis Publishing Group

Taylor & Francis Group is an international company that publishes books and academic journals and is located in the United Kingdom. It is a division of Informa plc, a United Kingdom-based publisher and conference company. The group was established in 1852. Thus, it is one of the well-known and most credible publishers in the world. The Taylor & Francis group is claimed to be the largest global academic publisher within Humanities and Social Sciences. Taylor & Francis publishes more than 2,400 journals, and approximately 6,500 new books each year, and a backlist of over 110,000 titles available in print and digital formats (Taylor & Francis Group, 2016). Because of the group's popularity won as a result their credibility, journals published by them have large coverage.

Methodology

Research Design

The study was quantitative. It employed the descriptive design. Since the aim of this paper was to assess readability in descriptive terms, descriptive design was used because descriptive study establishes only associations between variables (Blessing & Chakrabarti, 2009). Descriptive research helps to use numerical data to analyse associations using mathematically based methods. The approach therefore involves identification of attributes of a particular phenomenon based on an observational basis (Skovsmose & Borba, 2004).

The target population consisted of all academic journals published by Taylor & Francis publishing firm in the communication field of study. Articles of Taylor & Francis' top 11 journals in the humanities published in 2015 were selected for the readability analysis. The top journals were selected since they have the most citations indicating that they are read more often than others (not to mean they are easy to read). In addition, the topmost journals are most likely to suffer from what is termed Dr. Fox phenomenon, where unintelligible writing is perceived as more competent (Dolnicar & Chapple, 2014). The most current year with full issues were used because it was expected that changes in the publishing business should improve readability. The year 2016 which is the most current year was not used since the issues were not complete as at the time of writing this paper (October, 2016).

Readability scores were computed from the abstract of each single article in each issue per journal. Each abstract of each article was used to ensure sufficient representativeness and to remove biases. The choice of the abstracts other than other portions of each article has been discussed earlier.

Data Collection

PDF versions of the total number of articles of each of the 11 journals, totalling 246, were downloaded from www.tandfonline.com, the official database for scholarly journals of the Taylor & Francis Group. Five articles out of these did not have clearly labelled 'abstracts' and were therefore removed, and the remaining 241 articles used for the analysis. The downloaded articles were sorted according to issue numbers and journal name. The 241 abstracts were then copied into an online readability calculator to calculate its readability (www.webpagefx.com). This online calculator was used because it is very accurate and popular. Microsoft's Word Processor was not used to compute the readability scores because of its inability to compute Flesch Reading Ease (FRE) beyond 12.

Flesch Reading Ease (FRE) and related Flesch-Kincaid Grade Level (FKGL) test were used for computing the readability scores. The FRE was chosen because it is one of the most accurate and widely used readability formulas (Doak & Doak, 2010). It is

particularly appropriate for more advanced levels of texts and are based on sentence length and word difficulty (Shelley & Schuh, 2001). The FRE is a number between 0-100 indicating how difficult the text is to read. The higher the number the less difficult it is to read the text. This implies that a document that scores a FRE of say, 95, is easier to read and comprehend than another that scores 60 or less.

A related test which translates the Flesch Reading Ease test scores to grade level is the Flesch-Kincaid Grade Level formula. This test rates text on a USA school grade level. For example, a score of 8.0 means that an eighth grader can understand the document. For most documents, one should aim at a score of approximately 7.0 to 8.0. The results of the FRE and FKGL tests correlate approximately inversely. A text with a comparatively high score on the Reading Ease test should have a lower score on the grade-level test.

Data Analysis

With the help of IBM Statistical Products and Services Solutions (SPSS) version 23.0, frequencies, means, standard deviations, median and Interquartile range were used to describe readability, and the number of years required to read the articles in the journals (Objectives 1, and 2). A one sample T-test using bootstrapping technique was used to determine whether there were differences in the reading ease and the school years required to read, compared to standard scores. For the one sample t-test, bootstrapping was performed for samples of 1000 to ensure robust estimates of significant or p-value, standard errors and the confident intervals (IBM, 2013; Tabachnick & Fidell, 2013; Field, 2013), when t-test was significant. This was to ensure robust estimates for the mean differences and significant test. To achieve this, Bias corrected and accelerated (BCa) intervals were used since it ensures adjusted intervals that are more accurate (IBM, 2013). Mersenne Twister Random Number Generator was set to replicate a sequence of random numbers. This helped to preserve the original state of the random number generator and restore that state after the analysis was completed (IBM, 2013). The stratified method was used during the bootstrapping resampling with replacement from the original dataset, within the FRE and FKGL scores.

Bar graphs with standard error bars were used to analyse research question two.

Results and Discussion

Research question 1: How readable are the 11 topmost journals of Taylor & Francis Publishing Group?

This question was evaluated using descriptive statistics (mean, min, max, std. dev.). The findings are presented in Table 1.

Table 1: Descriptive statistics of FRE and FKGL scores

Name of Journal	Index	No	Minimum	Maximum	Mean	Std. Dev.
Communication and Critical/Cultural Studies	FRE	18.00	-12.40	27.20	11.88	8.92
	FKGL	18.00	15.70	25.30	19.13	2.15
Communication Education	FRE	22.00	-30.30	53.10	9.54	17.70
	FKGL	22.00	14.60	22.70	17.40	2.52
Communication Monographs	FRE	22.00	-8.10	43.70	13.80	11.49
	FKGL	22.00	12.20	20.70	16.72	2.02
Communication Teacher	FRE	35.00	-78.30	27.90	-8.75	26.45
	FKGL	35.00	13.00	48.30	22.55	6.97
Critical Studies in Media Communications	FRE	23.00	-39.20	35.10	11.77	17.68
	FKGL	23.00	15.00	27.20	19.14	3.21
First Amendment Studies	FRE	4.00	9.70	37.10	22.00	14.14
	FKGL	4.00	15.80	20.20	17.40	1.93
Journal of Applied Communication Research	FRE	25.00	-19.80	39.10	11.46	15.06
	FKGL	25.00	12.50	23.90	18.05	2.92
Journal of International and Intercultural Communication	FRE	18.00	-32.90	36.60	1.44	16.87
	FKGL	18.00	11.10	24.90	19.68	3.69
Quarterly Journal of Speech	FRE	34.00	-42.50	46.70	12.50	14.98
	FKGL	34.00	9.70	39.10	19.25	5.10
Review of Communication	FRE	16.00	-18.20	33.00	8.23	13.38
	FKGL	16.00	13.50	25.20	19.09	3.01
Text and Performance Quarterly	FRE	24.00	-13.80	54.20	18.75	18.50
	FKGL	24.00	9.80	22.90	17.40	3.47
Composite	FRE	241	-78.30	54.20	8.71	19.00
	FKGL	241	9.70	48.30	18.99	4.38

It is observed from table 1 that all 11 journals produced articles that were technically unreadable. (See Appendix C for full names of journals).

The easiest to read article from the Text and Performance Quarterly, was rated 'fairly difficult' to read (See Appendix A for interpretation of scores). As much as 10 out of the 11 journals recorded articles whose content were 'very difficult' to read (Negative FRE scores are interpreted as 0), requiring a minimum of college schooling to be able to read.

On the average, the easiest to read journal was rated as ‘very difficult’, requiring a minimum of college (University) schooling to be able to read (M = 22.00, SD = 14.14). This figure was recorded by the First Amendment Studies journal. Clearly, none of the journals stood out as easy to read relative to all others. All of them were graded at similar level of reading. Overall, it is noted that the topmost journals published by Taylor and Francis Group are, on the average ‘very difficult’ to read. They require a minimum of college education to read. These findings were statistically different from ‘standard’ recommended reading age of 8th grade (see Table 2).

Table 2: One sample t-test with bootstrapping for FKGL

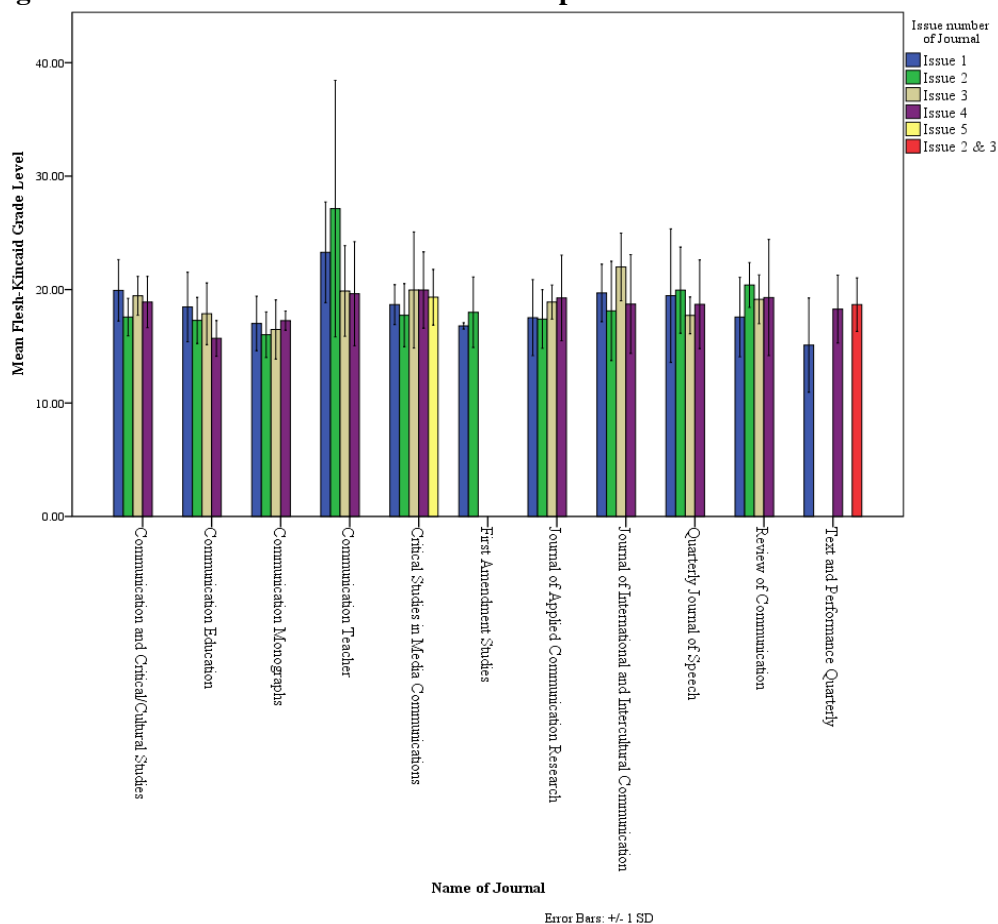
	Mean Difference Bootstrapa			
	Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval
			Lower	Upper
FKGL	10.99419	-.01162 .292	.001	10.43 11.61

The findings from this research corroborates what has been published Severance & Cohen (2015). The situation is the case despite rigorous reviewing process which is expected to improve manuscript readability for these top journals. It has been indicated that articles with lower readability are cited more (Stremersch et al., 2007), accepted more (Shelley & Schuh, 2001) and seen as more prestigious and competent (Armstrong, 1980). Dolnica and Chapple, (2014) have suggested that because there is weight on journals to publish more, but then at lower cost, articles that may qualify for publishing are presumably the ones that readers will consider as prestigious and skilfully written. Subsequently, a few writers see the decrease in intelligibility as coming about because of these adjustments in the publishing business. This, according Dolnica and Chapple, could account for the decrease in readability of prestigious journals in general, and in their accompanying abstracts.

Research Question 2: What is the trend in readability of research articles of the 11 topmost journals of Taylor and Francis Publishing Group considering the issue number?

This question was analysed using bar graphs with standard error. The results are presented in Figure 1.

Figure 1: Clustered bar chart of FKGL for top 11 Journals in the Humanities



It is observed that there are no apparent differences in the readability of the journals taking the issue numbers into consideration. This is so because as can be seen from Figure 1, the standard error bars overlapped each other for all journals, confirming that there were no significant differences. Although it has been indicated that standard error bars overlap cannot be used to judge statistical differences, it has equally been noted that as long as there are overlaps, it suggests no statistical significance.

The challenge to using standard error bars overlap to determine statistical significance which occurs when there is no overlap. In such instances, it cannot be said for sure whether there is statistical significance or otherwise (Motulsky, 2002). Hence, it is concluded that each of the 11 journals are very difficult to read regardless of the issue number. This indicates the readability of the journals did not improve with time.

Conclusion

Findings from this study indicated that the topmost 11 journals published by the biggest academic journal publisher in the Humanities (Taylor and Francis) are ‘very difficult’ to read. The readability did not improve over time. In a fast-paced world with limited time, more and more people are likely to read very little portions of published articles, focusing on the salient portions such as the abstract. Hence, very difficult to read articles are likely to be read less. Therefore, efforts must be made to improve the readability of these articles.

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Appendix A

APPENDIX B: READABILITY SCALE FOR INTERPRETATION

Reading score	Difficulty	Grade Level
90–100	Very easy	Grade 4
80–90	Easy	Grade 5
70–80	Fairly easy	Grade 6
60–70	Standard	Grades 7–8
50–60	Fairly difficult	Some high school
30–50	Difficult	High School & College
0–30	Very difficult	Minimum college

Source: Adapted from Flesch (1949)