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THE READABILITY OF OCCUPATIONAL INFORMATION LITERATURE

Since the turn of the century, the purpose of vocational information has been to provide knowledge about the world of work. The factors deemed essential by Frank Parsons (1909) were as follows: a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work. The suggested outline for the writing of occupational information literature as presented by the National Vocational Guidance Association of America, the Guidance Branch of the Department of Education of Alberta, and the Occupational Committee of the Kiwanis Clubs in the City of Calgary follows this same basic principle.

The traditional purpose of formal programs of occupational information is twofold: to acquaint the reader with a variety of occupations and to furnish him with authentic, realistic, factual information about specific occupations.

The level of readability is important to the reader of occupational literature and its study involves the consideration of many factors. Chall, in her monograph, *Readability* (1958) reviews pertinent research on the subject and provides a reference with an extensive bibliography. What is evident in her review is the lack of agreement in defining and considering the factors to be found in a study of readability.

To establish the elements of what is readable or not readable, or what is the difference between a piece of literature written by Shakespeare as compared to one of Plato's works, involves the art of writing. It is much similar to the creativity found in one type of literature as compared to another. In each case, constructs are expressed which are not easily identified. Certain variables may be isolated, however, which may aid in the prediction of some aspect of the construct. The formula used by Flesch (1949, p. 237), follows this principle.

The Meaning of Readability

Readability involves the interrelationship of legibility, interest, ease of reading, power to interest, ease of understanding, and comprehension. Further, consideration must be given to the motivating factor of the reader where one who is concerned about a topic will pursue it much more diligently than one who is not as concerned. The interrelationships of these factors are acknowledged without accepting cause. No attempt is made to discriminate the elements of content, style, format, or organization. Readability is limited to the elements of style which are to be found in the average sentence length in words; th average word length in syllables; the average percentage of "personal words"; and the average percentage of "personal sentences."

Average sentence length in words and average word length in syllables are two components of the 1948 revised edition of Rudolph Flesch's formula for ascertaining readability ease. His formula predicts the relative difficulty of literature on the assumption that increased length of the sentence tied to increased average word length in syllables increases the difficulty of reading. A sentence of eighty words is much more difficult to read than a sentence of five words, given the same average word length. The number of ideas presented in the former would have to be greater than the latter.

Table 1 is a representation of the Flesch (1949, p. 237) formula for readability ease. The formula expresses maximum readability as a value of 100 and minimum readability as avalue of zero. Thus an obtained score lying within the ranges outlined in column four is considered to be of a comparable estimated grade reading level as found in column five. Column one gives Flesch's description of the ranges: very difficult, difficult, fairly difficult, standard, fairly easy, easy, and very easy. Use of these terms is limited to descriptive labels for discussion purposes.

TABE I

Description of Flesch Readability Ease Formula for Level of Reading Difficulty

Description of Style	Average Sentence Length	Average No. of Syll. per 100 words	Reading Ease Score	Estimated Reading Grade
Very Easy	8 or less	123 or less	90 to 100	5th grade
Easy	11	131	80 to 90	6th grade
Fairly Easy	14	139	70 to 80	7th grade
Standard	17	147	60 to 70	8th and 9th grade
Fairly Difficult	21	155	50 to 60	10th and 12th grade
Difficult	25	167	30 to 50	college student
Very Difficult	29 or more	192 or more	0 to 30	college graduate

The second half of the Flesch formula refers to a "human-interest" score. The criteria are based on style elements of average percentages of "personal words," and average percentage of "personal sentences." "Personal words" are ". . . all first-, second-, and third-person pronouns except the neuter pronouns it, its, itself, and they, them, their, theirs, themselves if referring to things rather than people (Flesch, 1949)."

Words with a masculine or feminine natural gender in singular or plural forms are considered "personal words," as well as group words such as "people" and "folks." Personal sentences include those indicating conversation enclosed by quotation marks; questions, commands, requests or other sentences directed at the reader; exclamatory sentences or those sentences considered grammatically incomplete.

The analyst reliability for the second half of the Flesch formula is equivalent to the first half ranging in the nineties. The reliability and validity

of the second half of the formula is reported concomitantly with the first half.

Table 2 shows the conversion table presented by Flesch for the percentages of "personal words" and "personal sentences." A maximum of human interest is represented by 100. Thus any observed score between 0 to 10 is considered dull reading typical of scientific journals. Further description of the scores is as follows: scores of 10 to 20 are considered mildly interesting, exemplified by trade journals; those lying between 20 to 40 are interesting, indicative of a magazine like *The Reader's Digest;* while the *New Yorker* is considered highly interesting and represented by scores of 40 to 60, and fiction extends from 60 to 100 and is considered dramatic. These terms are used as descriptive labels to facilitate later discussion of obtained scores.

TABLE 2

Description of Flesch Readability Ease Formula for Degree of "Human Interest"

Description of Style	Percent of "personal words"	Percent of "personal sentences"	Human Interest Scores	Typical Magazine
Dull	2 or less	0	0 to 10	Scientific
Midly Interesting	4	5	10 to 20	Trade
Interesting	7	15	20 to 40	Digests
Highly Interesting	10	43	40 to 60	*New Yorker*
Dramatic	17 or more	58 or more	60 to 100	Fiction

THE PROBLEM

The youth of our junior and senior high schools require information about vocations and information about the world of work to extricate themselves from the proliferation of ideas and concepts for the decision-making process of high-school program choice, post-school program choice, and vocational choice. This decision-making process is considered develpmental. As one approaches maturity, information acquired or to be acquired has significant relevance to the individual. Acquired misinformation has to be replaced with correct concepts. The reading difficulty of literature which is significantly above the level of the reader's comprehension contributes to the acquisition of inappropriate concepts about a vocation or the world of work involving that vocation. The problem of concern is the applicability of the level of readability found in occupational information literature as it applies to the junior- and senior-high school students.

Our first hypothesis was that there is no significant difference between the reading difficulty level of occupational information literature expressed in grades and the proportional grade placement of the students in the public school system. (*The use of* "Public School System" here is restricted to the public schools of Calgary, Alberta.)

Our second hypothesis was that there is no significant difference between occupational information literature written locally and distributed by the

Vocational Committee of the Kiwanis Clubs of Calgary and occupational information literature distributed nationally and written for a national audience.

METHOD

The tools for this research were the 1948 version of the Flesch Readability formula and the statistical formulae for finding the mean, standard deviation, Pearson product-moment correlation coefficient, the *t* test, and the chi-square test of independence. In the application of the Flesch formula, a minimum of three 100-word samples were to be collected. For the longer articles, a maximum of 7 samples was collected. General agreement was found in the literature for beginning with the third paragraph and tables of random numbers provided the other paragraphs. The tables were entered, proceeding up and then down the columns until the number three appeared, then the following numbers were provided: 7, 10, 2, 6, 14, 5, 9, 8, 13, 19, 26, 25, 21, 4 and 34. Each piece of literature was analyzed in this manner where paragraphs 3, 7 and 10 provided the minimum number. Paragraph two was not used because the literature stated that the opening paragraphs of any piece of literature were not indicative of the whole passage. Thus, if a selection did not provide the tenth paragraph, then paragraph six and then five were used to provide the third sample. The longest article provided seven samples which were selectd to provide the best representative sample for the whole article. Thus paragraphs 3, 7, 10, 14, 19, 26 and 34 were used. Each sample was analyzed for number of words, number of sentences, number of syllables, number of "personal words," and number of "personal sentences," and each component was placed into the Flesch formula as directed in his book *The Art of Readable Writing* (1949).

THE SAMPLE

Forty pieces of occupational information literature were used in this study. Twenty had been produced locally and twenty were produced for provincial or national distribution by the Guidance Center of the Ontario College of Education and the Department of Labour of the Government of Canada.

Table 3 presents the results obtained from using the Flesch Formula as well as the names of the occupational information literature used. The first column represents the scores obtained from the local literature for readability ease while the second column represents the scores from the national literature. The mean, standard deviation, and Pearson product-moment correlation cofficient are also shown at the bottom of the table. The correlation coefficient of —.24 shows that there is a negative correlation between the readability levels of the two samples, but this coefficient is not statistically significant. When the means were compared, a *t* value of 2.35 was obtained showing a significant difference at the .05 level. The third column of Table 3 represents the "human-interest" scores from the Flesch formula for the local group and the fourth column for the national group. Neither the correlation coefficient of +.05 nor the *t* test of differences between means ($t = .801$) were significant. In order to compare the readability level of the literature with the actual enrolment at various levels of the Public School systems, a chi-square test was applied.

TABLE 3

Scores for Local and National Occupational Information Literature as Determined by the Flesch Formula

	Readability Ease		Human Interest	
	Local	National	Local	National
Petroleum Landman	23.0	51.9	9.9	9.6
Librarian	25.7	31.9	6.1	4.1
Insurance Career	26.2	37.3	8.5	24.6
Speech Pathology	28.1	4.4	6.4	6.4
Meterologist	30.9	35.8	15.4	7.7
Physics	33.2	30.1	6.4	13.8
Drafting	33.5	17.9	8.4	4.9
Psychologist	35.9	38.6	11.0	00.0
Purchasing Agent	36.5	39.6	6.7	15.1
Radio	37.1	33.3	10.7	16.3
Mathematician	38.9	34.3	8.2	9.7
Television	39.4	15.9	10.5	5.2
Printing	39.6	39.4	4.8	12.7
Veterinarian	44.9	7.6	17.5	7.1
Biological Sciences	37.7	27.9	37.7	11.9
Dentistry	47.8	35.8	17.3	1.3
Banking	47.9	27.9	23.6	28.5
Advertising & Publicity	52.1	48.1	13.0	25.4
Physician-Surgeon	58.4	28.6	24.1	4.1
Chemistry	69.9	15.2	15.2	3.5
Mean	39.79	30.572	13.07	10.60
Standard Deviation	11.86	12.88	7.98	8.07
Correlation	$r = -.24$		$r = 0.05$	

A two-by-four contingency table (Table 4) shows the observed frequencies of the readability levels of the occupational literature, while another two-by-four table (Table 5) shows the expected frequencies (as based on actual enrolment in 1967).

TABLE 4

Observed Frequencies of the Literature by Grade Placement

	Grade Level			
Group	7	8 and 9	10 to 12	Over 12
Local	0	1	2	17
National	0	0	1	19

TABLE 5

Expected Frequencies of the Literature by Grade Placement

Group	Grade Level 7 (N = 5,468)	8 and 9 (N = 10,239)	10 to 12 (N = 11,665)	Over 12 —
Local	4	7.4	8.6	0
National	4	7.4	8.6	0

The chi-square test applied to these data yield a value of 28.72 which is significant at the .001 level for 3 *df*.

A further analysis of the data was done on the basis of percentage distribution of grade-level difficulty for readability and for the degree of human-interest content.

These data are shown in Tables 6 and 7. An examination of these tables shows that the larger percentages tend to accumulate at the upper end of the readability continuum. The human interest content percentages, on the other hand, tend to range from "interesting to dull"—with the larger proportions being in the "dull" classification.

TABLE 6

Observed Proportional Frequencies in the Distribution of the Literature by Grade Level of Reading Difficulty

Group	Grade Level Grades 8 & 9	Grades 10 to 12	Grades 13 to 16	Grades 16 & over
Local	1 - 5%	2 - 10%	13 - 65%	4 - 20%
National	0 - 0%	1 - 5%	11 - 55%	8 - 40%

TABLE 7

Observed Proportional Frequencies in the Distribution of Literature by Level of "Human Interest"

Description	Score Range	Local	Percentage	National	Percentage
Dull	0 - 10	9	45%	12	60%
Mildly Interesting	10 - 20	8	40%	5	25%
Interesting	20 - 40	3	15%	3	15%
Very Interesting	40 - 60	0		0	
Dramatic	60 - 100	0		0	

DISCUSSION

Forty pieces of occupational information literature from two different sources were analyzed. Locally-produced literature was found to be significantly better than nationally-produced literature in terms of Flesch's readability ease score. Better than four-fifths of the literature was rated above the reading level of the senior student in the senior high school or at the scientific level with respect to reading ease.

Nearly half of the literature was considered in the "dull" category when human interest scores were studied. Local literature was not significantly different from national literature with respect to human-interest scores.

Only ten percent of the local literature reached the readability level of a senior-high-school student while only one out of the twenty pieces of national literature reached the same level.

The limitations of the Flesch formulas for measuring readability lies within the analysis for the proportions of words and sentences. It has a further limitation of an unestablished reliability or validity for the student population in the City of Calgary. Within the limitations of the sampling of literature, word-samples, and analysis error, along with the previously mentioned limitations, occupational information literature does not meet the reading requirements of the average junior-high-school student. Doubts exist as to the applicability of the literature for the average high-school student.

It is reasonable then to express concern with the lack of cognition by writers of the interest and reading level of junior-senior high-school students. No attempt appears to have been made to streamline literature for the population which greatly needs it. No evidence exists to indicate that writers are aware of the needs of the junior-high-school students with regard to their reading level. Certainly, no evidence exists to indicate that writers are advised of this need.

Further research of a continuing nature is needed to recognize the interest needs and reading level needs of our junior-senior high-school population. Results indicate that literature produced on a local basis for a local population is significantly better. This should be encouraged with the use of research and increased awareness of the problems of the students. School boards and school committees must become cognizant of the need for better occupational information literature so that personnel, facilities, and monies are allotted to pursue the task.

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Les auteurs ont analysé certaines pièces d'information que l'on retrouve dans les écoles secondaires. L'analyse s'est faite du point de vue de niveau scolaire du matériel ainsi que du point de vue d'intérêt humain. Plus spécifiquement on applique la formule "Flesch" à 20 publications nationales ainsi qu'à 20 publications locales (Calgary, Alberta).

Les résultats indiquent que le niveau de la littérature d'information publiée se situe bien au-delà du niveau de la population scolaire à laquelle elle s'adresse. Dix neuf sur vingt des publications nationales analysées se situent à un niveau supérieur à celui de la douzième année. D'autre part, dix-sept des publications locales se situent à ce même niveau.

Si l'on examine cette même littérature du point de vue d'intérêt humain, l'on retrouve la plupart des pièces dans la classe "ennuyant" ou "légèrement interessant." Aucune des pièces ne peut être qualifiée comme étant "très interessant." On déplore le fait que les auteurs de cette littérature ne soient pas plus au courant des besoins des étudiants.