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Review Article

**Theoretical Orientation for Readability
Assessment in Bengali Language of Extension
Literatures Related to Farming**

ABSTRACT

Readability of a text generally refers to how well a reader can comprehend the content of a text, through reading. Readability is closely related to the understandability of the messages. Extension education is an applied behavioural science. Its main purpose is to bring about desirable changes in human behaviour usually through different strategies and programme of change and by applying the latest scientific and technological innovations where extension messages are sent largely through text. In Bengali language, only a few works on readability is found but their study is restricted to broad range of documents like newspaper article, short stories, interviews, and blogs to philosophical articles but there is no such research done on readability of Bengali extension literatures targeting the farming community. So, there is a need for studying on readability of Bengali extension literature for promotion of agricultural education. Assessment of readability of Bengali extension literatures is an imperative task for promotion of agriculture education among the millions of farmers who speaks and read in Bengali language across this subcontinent and Bangladesh with a view that the text messages become more understandable to the target audience. In this context the present theoretical orientation had been prepared with the objectives to measure the readability of Extension literatures in Bengali Language related to farming along with the analytical tools or procedures uses in readability assessment of a Bengali text associated with farming extension literature.

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Keywords: Readability, Bengali Language, Extension Literature, Farmers.

1. INTRODUCTION

Extension Education is an applied behavioural science. Its main purpose is to bring desirable changes in human behaviour [1] usually through different strategies and programme and by applying the latest scientific and technological innovations [2]. For this, communication between the innovators and the users is very much essential [3]. Among different types of communication, printed media plays an essential role. There are different types of printed media such as newspaper; magazine, bulletins, leaflet, folder, rural journals, farm journals etc and they are mainly for the literate section of the people [4]. With the increasing literacy rate the number of readers is also increasing day by day [5]. As huge cost, effort, time is required in preparing the printed forms, so it must be made sure that the right information should reach the right audience at right time [6]. Extension has a concern to percolate the right message to the right audience. Reading the message and understanding it properly is related to the readability of the specific communication text. The purpose of printed communication media will fair if the message is not readable to the audience [7]. A text is generally made to provide some information or ideas to the readers. So, readability of the text is very much important as it will decide the success of given information [8]. If the text is

32 not readable to the readers, the purpose of writing the text will fail. The readers will be bored,
33 confused and frustrated when they will try to read a poorly prepared document. A hard,
34 difficult text can create an adverse and negative effect to the readers. Therefore,
35 assessment of readability through numerous formulas can help to understand the readability
36 of the text. Generally, most of the readers have an average to poor readability. So, before
37 going to be published a text if the text's readability is checked, the popularity of the
38 document can be understood. Readability formulas do not require the readers to first go
39 through the text to decide if the text is too hard or too easy to read. By using readability
40 formulas, the writer can easily understand whether the readers can understand his text.
41 Readability formulas help the text creators to convert the document into plain language if the
42 readability levels are low or high. Using readability formulas to perfect a document can help
43 readers to increase their retention, comprehension, and speed of reading. This, in turn,
44 smoothens out the work-schedule of the readers. These formulas can save time and money
45 at a time. A readable text always attracts a larger reader-base [9]. A lot of efforts have been
46 made to develop and standardise readability formulae for English, French, Japanese,
47 Western European languages and others. In India, some researches on readability have
48 been made on Kannad [10]; Malayalam [11]; Hindi [12] and in other local languages. In
49 Bengali language, only a few works on readability is found but their study is restricted to
50 broad range of documents like newspaper article, short stories, interviews, and blogs to
51 philosophical articles [13] and most of the respondents were highly educated (Post- graduate
52 & Graduate fellows). But there is no such research has been done on readability of Bengali
53 extension literatures targeting the farming community. So, there is an imperative need for
54 studying assessment of readabilities of Bengali literature for promotion of agricultural
55 education.

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2. CONCEPT OF READABILITY:

58 The term readability was conceptualized in three ways: (i) to indicate legibility of either hand
59 writing or typography, (ii) to indicate ease of reading due to either the interest value or the
60 pleasantness of writing, and (iii) to indicate the ease of understanding or comprehension due
61 to style of writing [14]. As the Literacy Dictionary points out "Text and reader variables
62 interact in determining the readability of any piece of material for any individual reader" [15].
63 The purpose of readability assessment is to affect a 'best match' between intended readers
64 and texts. Thus, optimal difficulty comes from an interaction among the text, the reader, and
65 his/her purpose for reading [16]. Language experts also calculate readability through
66 producing a score by different readability formulas. The formulas are widely used to match
67 texts with the reading level of the audience. Extensive research has shown that the popular
68 readability formulas are not 100% accurate, but they give a "good rough estimate" of the
69 reading skill required to read a text. The readability formulas have greatly benefited millions
70 of readers throughout the world in many languages. If there is any problem with the
71 formulas, it is that they are not used enough [14, 17-18].

3. DIFFERENT DEFINITIONS OF READABILITY:

73 Reading helps learning and enjoyment. So, what we write should be easy to understand
74 [19]. Readability always would go with understand ability [6]. The term readability usually
75 described the stylistic factors in writing, which would make it easier to read [20]. Style of
76 writing commonly eases the understanding or comprehension of a text [14]. Thus, out of
77 many issues such as content, coherence, and organization writing style is important one.
78 The readability can also be explained as the level to which a given class of people find
79 certain reading matter convincing and understandable [21]. Here the interaction between the
80 text and a class of readers of unknown characteristics such as reading skill, prior knowledge,

81 and motivation is highlighted. UNESCO explained readability as a piece of written material is
82 said to be readable if it could be read and understood by the reader for whom it was
83 intended [22]. Agricultural publications used the term readability to denote reading
84 comprehension, reading efficiency and readers' judgement of readability [23]. Readability
85 furthermore visualized as transforming of information into words and sentences that the
86 average reader would understand and enjoy [24]. Moreover, readability also can be
87 considered as the characteristic of the material that determines how difficult or easy it is to
88 read and understand [25]. They further indicated that, the effectiveness of printed materials
89 depends on a variety of factors including (i) readability, (ii) comprehension and (iii) the
90 amount and type of information presented [26]. The definition of Dale and Chall may be the
91 most comprehensive: "The sum (including all the interactions) of all those elements within a
92 given piece of printed material that affect the success a group of readers have with it [27].
93 The success is the extent material which they understand it, read it at an optimal speed, and
94 finds it interesting. Table 1 comprises different Readability formulas used in different
95 languages worldwide.

96 **4. PURPOSE OF READABILITY:**

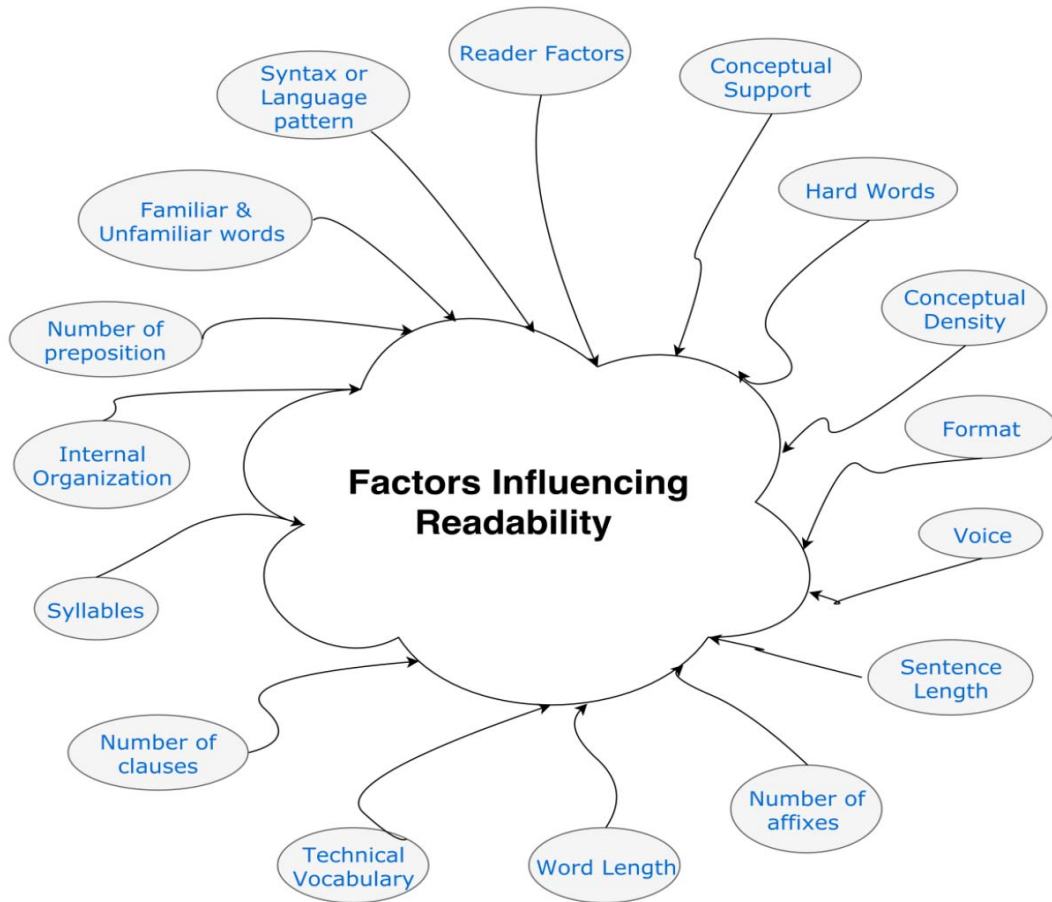
97 Since 1940's researchers had developed many readability formulae. The formulae are
98 mainly to assess the text readability of English, French, Spanish, Japanese, and Dutch.
99 Mainly these are Western European languages. But there exists no quantitative study of
100 readability on any Indian Language excepting a study on Bengali language. The need for
101 making readability Index for Bengali is quite natural. This index when applied on a sample
102 document would estimate the grade or the level for which the document is prepared. This
103 would naturally be very helpful for the screening of texts from huge samples. Moreover, the
104 readability formulae for English may not be directly applicable for the colloquial language
105 such as Bengali. This is because European scripts are pseudo-phonetic while Bangla is a
106 syllabic script with graphemes representing clusters and ligatures. There are certain features
107 or parameters in Bangla which need to be incorporated in the index to give better scores for
108 Bangla Text [39].

109 110 **3. FACTORS INFLUENCE READABILITY:**

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112 Readability indicates to all the factors those affect the readers to be succeeded in reading
113 and understanding a text [7]. While writing a text, an article, a work-sheet or an examination
114 paper, author's intent is to transmit information to the reader [8]. Whether the writer can
115 convey his ideas will depend on the readability of the text. Readability is concerned with the
116 problem of matching between reader and text [8]. A good reader will be bored by simple
117 repetitive texts with less information; on the other hand, a poor reader will soon lose his
118 attention if he finds the text too difficult to read fluently. Fig. 1 represents various factors
119 influence readability in general.

Table 1: Readability formulas used in different tracts worldwide:

Sl. No.	Chronological Year	Readability Formulae	Salient Features	Language	Reference
1.	1948	Flesch Reading Ease	---	English	[28]
2.	1948	Flesch Kincaid	Most reliable when used with upper elementary and secondary materials	English	[28]
3.	1952	Gunning Fog	Widely used in the health care and general insurance industries for general business publications.	English	[29]
4.	1953	Spache Readability Index	Up to 3 rd grade level students.	English	[30]
5.	1958	Powers-Sumner-Kearl	Primary / early elementary level materials	English	[31]
6.	1958	Kandel & Moles	For French Texts (Modified Flesch Reading Ease)	French	[32]
7.	1966	Bormuth Index	For Academic Documents	English	[33]
8.	1967	Coleman-Liau	4th grade to college level readers	English	[34]
9.	1967	Automated Readability Index (ARI)	Technical documents and manuals	English	[35]
10.	1968	Laesbarheds index (LIX)	Readability assessment for Western European Languages	Western European Languages	[32]
11.	1964	SMOG Index	Simple Measure of Gobbledygook - For Healthcare	English	[36]
12.	1973	Forcast Index	Focuses on functional literacy, questionnaires, forms, text that is not in narrative form	English	[32]
13.	1974	Kane Index	Readability assessment for Mathematical purpose	Mathematics	[37]
14.	1977	Raygor Readability Estimate	Readability assessment for newspapers and journals	English	[32]
15.	1979	Hull formula	Readability assessment for Technical Writings	English	[32]
16.	1986	Fry Graph	For elementary assessment through college and beyond	English	[19]
17.	1992	Hayashi	Readability assessment for Japanese Texts	Japanese	[32]
18.	1995	New Dale-Chall	For upper elementary through secondary materials	English	[16]
19.	1996	Douma	For Dutch Texts (Modified Flesch)	Dutch	[38]
20.	2004	McAlpine EFLAW	For ESL (English as a Second Language)	English	[32]
21.	2006	Strain Index	Readability assessment for general text	English	-



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Fig. 1: Factors influencing readability

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Different factors have been identified to determine the readability of a text. They are as follows:

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126 **3.1 Sentence length:**

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Variation in sentence length is desirable. Shorter sentences tend to be less difficult to read because they contain fewer ideas and fewer connections between ideas, but a text contains only short sentences becomes monotonous to read. A text that contains only long, complicated sentences is difficult to read[40]. Sentence length or words per sentence was taken as a factor in the formulae such as Flesch Reading Ease [28], Flesch-Kincaid [28], Gunning Fog [29], Fry Graph [19], New Dale-Chall[16], Power-Sumner-Kearl[31], Spache[30], Automated Readability Index (ARI) [35], Bormuth Index [33]. McAlpine EFLAW [32], Laesbarheds index (LIX) [32], Douma [38], Das and Roychudhury [39]. Average number of sentences was taken in Raygor Readability Estimate [32] and by Das and Roychudhury [39].

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137 **3.2 Word length:**

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Word length was taken as a factor in Powers-Sumner-Kearl[31], Automated Readability Index (ARI) [35], Bormuth Index [33]. In Raygor Readability Estimate [32] number of words containing 6 or more letters, in McAlpine EFLAW [32], high proportion of mini words (words containing 1, 2 or 3 letters) and in Laesbarheds index (LIX) [32] number of long words (over

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142 six characters) were taken to measure readability. Das and Roychudhury [39] took length of
143 words (in characters), numbers of words of 6 or more characters.

144 **3.3 Syllables:**

145 Total syllables per word were taken as factor in Fiesch Reading Ease [28], Douma [38], Das
146 and Roychudhury [39] and Forcast [32]. Das and Roychudhury [39] counts number of
147 monosyllabic words whereas in Fry Graph [19] number of syllables in 100 words sample and
148 in Kane [37] Das and Roychudhury [39] number of different words with 3 or more syllables
149 were taken as readability factor. Generally, the fewer syllables a word has, the more
150 readable it is [40].

151 **3.4 Hard words:**

152 Number of hard words present in a text was taken as a readability factor in Gunning Fog
153 [29], SMOG [36], Spache [30].

154 **3.5. Unfamiliar and familiar words:**

155 In New Dale-Chall [16] unfamiliar word and in Bormuth Index [33] familiar words per word
156 were taken as factors to measure text readability.

157 **3.6 Number of prepositions:**

158 Number of prepositions present in the text was taken as a factor by Das and Roychudhury
159 [39] in measuring the readability of a text.

160 **3.7 Words:**

161 Unfamiliar, abstract, and difficult-to-decode words tend to make for difficult reading [41].

162 **3.8 Syntax or language patterns:**

163 Repeated sentences or phrases make for easy reading. Long, complex sentences and
164 sentences written in passive voice are more difficult to read [41].

165 **3.9 Number of affixes (suffixes and prefixes):**

166 Words with suffixes and prefixes tend to be harder to read because they add another
167 element of meaning that readers must understand [40]. This factor was taken by Das and
168 Roychudhury [39].

169 **3.10 Internal organization:**

170 The clarity (or lack) of presentation of ideas affects readability. Well organized expository
171 texts with clear statements of purpose followed by complete discussions of key points are
172 easier to read than texts organize in some other way [41].

173 **3.11 Contextual support:**

174 Textbook-like texts may have (or lack) features such as headings, graphics, illustrations etc.
175 which can affect the readability of a text [41].

176 **3.12 Format:**

177 Front size, length, and even the appearance of the text on a page can cause a text to look
178 difficult to read [41]. The major factors affecting readability relate to the relative proportions
179 of horizontal to vertical space; line width, type, size, space between lines, words and letters
180 [42].

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183 **3.13 Number of clauses:**
184 Sentence containing more than one clause are harder to read, since the reader must be able
185 to understand the connection between the thoughts contained in the various clauses [40].

186 **3.14 Voice:**
187 Passive verbs make a sentence more complex. Passive constructions not only require more
188 words but also obscure the real source of the action [40].

189 **3.15 Technical vocabulary:**
190 Many words have meanings that are used in a specialized field of study or vocation. These
191 words are important for those who are in those fields, but they communicate poorly to those
192 who are not [40].

193 **3.16 Concept density:**
194 Concept density refers to the number of ideas contained in an expression. A sentence that
195 contains many ideas is harder to read because readers must spend extra energy for
196 analysing the text. Sentences with fewer ideas are more readable [40].

197 **3.17 Reader factors:**
198 Reader factors such as prior knowledge, reading ability, and motivation of the reader affect
199 readability of the text [43].

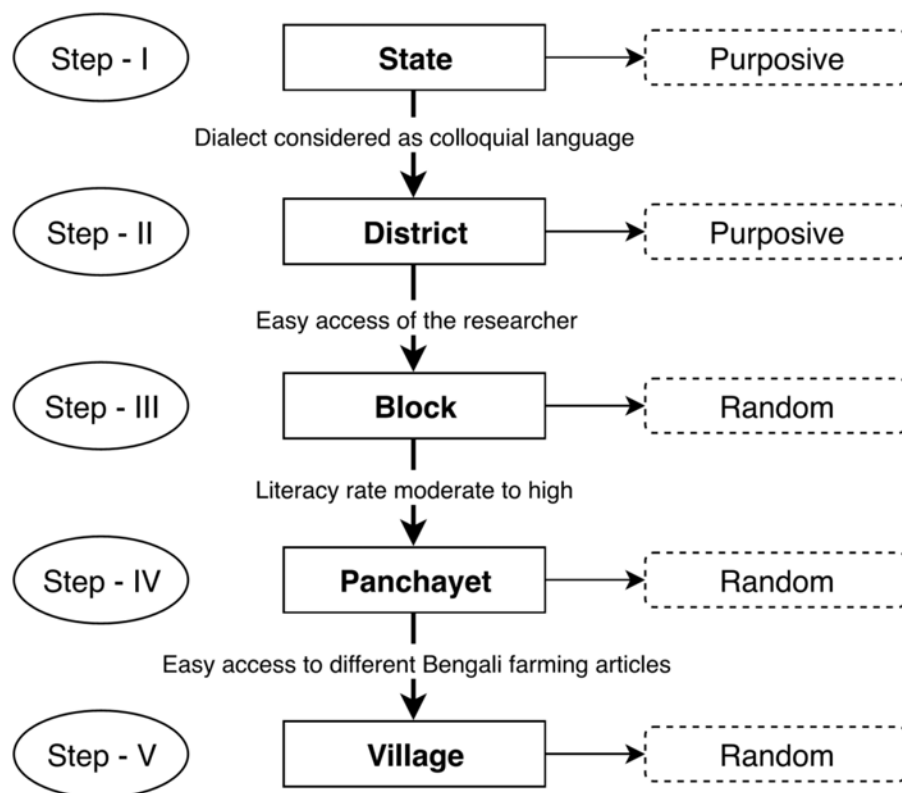
200 **3.18 Number of pronouns:**
201 Number of pronouns present in the text was taken as a factor by Das and Roychudhury[39]
202 in measuring the readability of a text.

203 **4. DIRECTIONS FOR READABILITY ASSESSMENT OF FARMING EXTENSION** 204 **LITERATURES:**

205 Any readability formulae can be used in different perspective of communication and
206 education of the target audience. In this respect, a variety of people may use the formulas
207 for their own purposes. For this instance, a guidelines or direction become essential for the
208 benefit of the users to be dealt with farming extension literatures. Without knowing the clear-
209 cut ideas, the measurement of variables or steps involved in calculating the readability would
210 be extremely difficult. Therefore, the steps to be followed to calculate the readability of
211 farming extension literatures are:

212 **4.1 Selection of Samples:**
213 Based on the circulation, leading newspaper(s) or magazine whichever, publish agricultural
214 news will be selected. Next, from a corpus of publications a single article on agriculture will
215 be selected randomly from the texts.

216 **4.2 Sampling of readers:**
217 Each selected text is subjected to test to a group of informants coming from similar
218 academic background and social status [44]. Selection of sample respondents through a
219 proper sampling technique has been shown in **Fig. 2**.



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Fig. 2: Sampling frame for selection of readers.

4.3 Identification and finalization of variables:

From the existing literature on readability an inventory of variables was developed from available documents and universe of variables were developed and listed accordingly. Out of those variables a few variables which were not related to Bengali language were excluded. Therefore, variables responsible for readability in Bengali extension literature can be identified and finalized. The list of variables recognised were summed up in Table 2.

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Table 2: List of readability variables for Agricultural extension literature and their measurement.

Sl. No.	Readability variables	Measurement
1.	Sentence in an article	Total number of sentences counted in an article
2.	<i>Juktakkhar</i>	Total number of <i>jukta-akshars</i> in a text. It is an important feature for Bangla because each of the clusters has separate orthographic and phonemic (in some cases) representation than the constituents consonants.
3.	Letter in an article	Total number of letters counted in an article
4.	Bold Text in an article	Number of bold texts divided by total number of words
5.	Total number of syllables	Total number of syllables counted in each article.
6.	Number of Punctuation	Total number of punctuations divided by total number of sentences.
7.	Technical vocabulary	Total number of technical vocabularies divided by total number of words.
8.	Number of Pronoun	Total number of pronouns divided by total number sentence
9.	Number of Passive Voice in an article	Number of passive voices used divided by total number of sentences.
10.	Use of Prefix suffix in an article	Number of prefix suffix divided by total number of words.
11.	Number of paragraph/stories	Number of paragraphs in an article.
12.	Total Number of Words	Total number of words in an article.
13.	Total Characters	Total character implies number of letters, punctuations, typescripts, space, and letterings in an article.
14.	Complex words	Number of complex words in an article (<i>Tatsama</i> words with more than 2 syllables is considered as complex words)

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4.4 Extraction of parameters:

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Content analysis [45] could be administered to extract the selected parameters based on the standardized quantitative technique for the selected communicating material. The procedure should be gone through objectively and systematically. The process of Content analysis has six main stages: selecting content for analysis, units of content, preparing content for coding, coding the content, counting and weighting and drawing conclusions.

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4.5 Collection of data:

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The selected texts would be provided to the farmers and they will be asked to read them carefully under the supervision of the researcher. Then the readers will be requested to mark the text into 10-point scale i.e. Very easy to very difficult [39].

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4.6 Statistical analysis:

Different statistical techniques and methods are used to understand the complex relationship amongst different readability factors. Some of such important statistical analysis techniques, generally used in readability analysis were summarized in **Table 3**.

254 **Table 3:** Statistical analysis used in readability study

Sl. No.	Statistical Tool	Purpose
1.	Mean	Mean is the arithmetic average and is the result obtained when the sum of the of value of individual in the data is divided by the number of individuals in the data
2.	One-way ANOVA	The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of two or more independent (unrelated) groups.
3.	Canonical Discriminant Analysis	Canonical discriminant analysis is a dimension-reduction technique that is related to principal component analysis and canonical correlation. Given a nominal classification variable and several interval variables, canonical discriminant analysis derives canonical variables (linear combinations of the interval variables) that summarize between-class variation in much the same way that principal components summarize total variation.
4.	Content Analysis	Content analysis is a research technique used to make replicable and valid inferences by interpreting and coding textual material.
5.	Backward regression Analysis	In regression methods, Backward elimination or regression involves starting with all variables, testing the deletion of each variable using a chosen model fit criterion, deleting the variable (if any) whose loss gives the most statistically insignificant deterioration of the model fit.
6.	Factor Analysis	Factor Analysis is a method for modeling observed variables, and their covariance structure, in terms of a smaller number of underlying unobservable (latent) "factors."

256 **4.4 Assimilation:**
257 Assimilation is the step where all the obtained inferences in the various steps will be
258 integrated. In this step the set of parameters will be included in the regression model.

259 **4.5 Model building:**
260 Model building is a purely statistically procedure where the technique of multiple regression
261 [46] will be used. Least Square Method will be employed to estimate the various parameters
262 in the model.

263 **5. SCOPE OF THE STUDY:**

264 The researcher and extension personnel can use this procedure to determine whether the
265 information through a printed media they want to spread out among the readers is suitable to
266 their level or not. Agricultural news publishing agencies can use this modus operandi for
267 adjusting the difficulty level of their publications to the reading ability of readers. Among
268 corpus of variables, after proper statistical analysis the key variable will be identified. These
269 key variables also can be considered as Minimum Data Set (MDS) for the succeeding study.
270 With an enormous effort and a vast survey of the farming community, a guidelines or formula
271 can be prepared for later use. This guideline not only helps to check the readability status of
272 a farming extension article but also serves the writer in creation of newer piece of writing
273 related to Bengali extension literature for farming community.

274 **COMPETING INTERESTS**

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276 Authors have declared that no competing interests exist.
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278 **CONSENT**

279 All authors declare that 'written informed consent was obtained from the patient (or other
280 approved parties) for publication of this case report and accompanying images. A copy of
281 the written consent is available for review by the Editorial office/Chief Editor/Editorial Board
282 members of this journal.
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284 **REFERENCES**

- 285
286
287
288 1. Prasad SV. Fundamentals of Rural Sociology and Educational Psychology.
289 Department of Extension Education. Acharya NG Ranga Agricultural University. 2006.
290 2. McQuail D. Mass communication theory: An introduction. (2nd Ed) Thousand Okas, CA
291 Sage Publications, Inc; 1987.
292 3. Patil DM. Recent Trends of Print Media In Development Communication. Global
293 Media J Indian Edition. 2011; 2(2):2-20.
294 4. India [Internet]. [cited 2019 Mar 30]. Available from:
295 <https://en.unesco.org/countries/india>
296 5. Frolova S. The Role of Advertising in Promoting a Product [Internet]. 2014 [cited 2019
297 Mar 30]. Available from:
298 https://www.theseus.fi/bitstream/handle/10024/80777/Frolova_Svetlana.pdf

- 299 6. Kamath MG. Writing for farm families. Allied publishers Pvt. Ltd., Bombay; 1969.
- 300 7. Kumar A. Content analysis of agricultural information in kannada dailies and to know
- 301 the reading habit of farmers, M.Sc. Thesis, submitted to University of Agricultural
- 302 Sciences, Bangalore; 2000.
- 303 8. Leonard E. Writers on writing: Easy on the adverbs, exclamation points, and
- 304 especially hooptedoodle. New York Times. 2001 Jul 16;16-20.
- 305 9. Nanjappa D. Development and standardization of readability formula for kannada
- 306 language and its application, Ph.D. thesis UAS Bangalore; 1992.
- 307 10. Rajan PK. Effectiveness of communication through the farm news service of Kerala
- 308 Agricultural University.M.Sc.(ag.) Thesis (unpublished), Kerala agric. Univ., Mannuthy;
- 309 1982.
- 310 11. Richaudeau F. Recherchesactuelles sur la lisibilité. Actualité des scienceshumaines,
- 311 Paris, Retz.; .1984.
- 312 12. Prakash RK, Mathur PN. Effectiveness of “unnatkrishi” farm magazine as related to
- 313 different categories of readers. Indian J Extn Edu. 1975;11(1-2):49-53.
- 314 13. Sinha M, Sharma S, Dasgupta T,Basu A. New readability measures for Bangla and
- 315 Hindi texts. In Proceedings of COLING. Posters, pages, Mumbai, India. The COLING.
- 316 Organizing Committee.2012;1141–50.
- 317 14. Klare GR. The Measurement of Readability. Iowa State University Press, Ames, IA;
- 318 1963.
- 319 15. Harris TL, Richard EH. The literacy dictionary: The vocabulary of reading and writing.
- 320 Newark, DE: International Reading Association; 1995.
- 321 16. Chall J,Dale E. Readability Revisited: The New Dale-Chall Readability Formula.
- 322 Brookline Books, Cambridge; 1995.
- 323 17. Chall J. Readability: An Appraisal of Research and Application. Rapport technique,
- 324 Bureau of Educational Research Monographs, Columbus: 011: Ohio State Univ.
- 325 Press; 1958.
- 326 18. Timothy L. Unlocking Language: The Classic Readability Studies. In: DuBay WH,
- 327 editor. IEEE TRANSACTIONS ON PROFESSIONAL COMMUNICATION [Internet].
- 328 IEEE; 2007. p. 416–7. Available from:
- 329 <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=4669921>
- 330 19. Fry EB. Varied uses of readability measurement. Paper presented at the 31st Annual
- 331 Meeting of the International Reading Association, Philadelphia, PA; 1986.
- 332 20. Ahuja BN. Theory & practice of journalism: set to Indian context; 1979.
- 333 21. Mc Laughlin G. SMOG grading: A new readability formula. J Reading. 1969;
- 334 12(8):639-46.

- 335 22. Westerink LG. Anonymous prolegomena to Platonic Philosophy; 1963.
- 336 23. Klare GR. A Second Look at the Validity of Readability Formulas. *JReading Behavior*.
337 1976;8(2):129-52.
- 338 24. Beers K. *When Kids Can't Read: What Teacher's Can Do*. Portsmouth, NH:
339 Heinemann, 2003.
- 340 25. Berardo SA. The use of authentic materials in the teaching of reading. *The Reading*
341 *Matrix*. 2006;6(2): 60-69.
- 342 26. A story of fish cultivation in common water bodies at Chhattisgarh | agropedia
343 [Internet]. [cited 2019 Mar 30]. Available from: [http://agropedia.iitk.ac.in/content/story-](http://agropedia.iitk.ac.in/content/story-fish-cultivation-common-water-bodies-chhattisgarh)
344 [fish-cultivation-common-water-bodies-chhattisgarh](http://agropedia.iitk.ac.in/content/story-fish-cultivation-common-water-bodies-chhattisgarh)
- 345 27. Dale E, Chall J. The concept of readability. *Elementary English*. 1949;26(1):19-26.
- 346 28. Flesch R. A new readability yardstick. *JApplied Psychology*. 1948;32(3):221-233.
- 347 29. Gunning R. *The Technique of Clear Writing*. McGraw-Hill, New York; 1952.
- 348 30. Spache G. A new readability formula for primary-grade reading materials. *The*
349 *Elementary School J*. 1953;53(7):410-413.
- 350 31. Powers RD, SumnerWA, Kearl BE. A recalculation of four adult readability
351 formulas. *Journal Educational Psychology*. 1958;49(2):99-105.
- 352 32. Alotaibi S, Alyahya M, Al-Khalifa H, Alageel S, Abanmy N. Readability of Arabic
353 medicine information leaflets: a machine learning approach. *Procedia Computer*
354 *Science*. 2016;82: 122-126.
- 355 33. Bormuth J. Readability: A new approach. *Reading Research Quarterly*. 1966;1(3):79-
356 132.
- 357 34. Coleman M, Liao TL. A computer readability formula designed for machine scoring. *J*
358 *Applied Psychology* 1975;60(2): 283-284.
- 359 35. Venger O. Internet Research in Online Environments for Children: Readability of
360 Privacy and Terms of Use Policies; The Uses of (Non) Personal Data by Online
361 Environments and Third-Party Advertisers. *JVirtual Worlds Res*. 2017;10(1): 1-15.
- 362 36. Mc Laughlin GH. SMOG grading-a new readability formula. *J Reading*. 1969;12(8):
363 639-46.
- 364 37. Janan, Wray D. Reassessing the Accuracy and Use of Readability
365 Formulae. *Malaysian J Learning Instruction*. 2014;11: 127-145.
- 366 38. Du bay W. *The principles of readability*. Impact Information; 2004.
- 367 39. Das S. Roychoudhury R. Readability modelling and comparison of one and two
368 parametric fit: A case study in Bangla. *J Quantitative Linguistics*. 2006;13(1):17-34.
- 369 40. GOD'S WORD Translation Bibles and Evangelism Resources – God's Word Mission
370 Society [Internet]. [cited 2019 Mar 30]. Available from: <https://godsword.org/>

- 371 41. Padak N. Looking at readability for adult literacy learners. 1993 [Retrieved December
372 10, 2008] from: <http://literacy.kent.edu/Oasis/Pubs/0300-45.pdf>
- 373 42. Reed KX. An analysis of reading levels of students and readability levels of textbooks
374 at second junior colleges in the state of Alabama. 1988 (Unpublished doctoral
375 dissertation, University of Auburn). Retrieved October 12, 2008, from:
376 [http://proquest.umi.com/pdqweb?did=744752841&sid=2&Fmt=2&clientId=46449&PQT](http://proquest.umi.com/pdqweb?did=744752841&sid=2&Fmt=2&clientId=46449&PQT=309&VName=PQD)
377 [=309&VName=PQD](http://proquest.umi.com/pdqweb?did=744752841&sid=2&Fmt=2&clientId=46449&PQT=309&VName=PQD)
- 378 43. Mikk J. Methods of Determining Optimal Readability of Texts.J Quantitative
379 Linguistics. 1995;2(2):125-132.
- 380 44. Berelson B. Content Analysis in Communications Research, Glencoe, Ill.1952;The
381 Free Press.
- 382 45. Davie R, Butler N, Goldstein H. From birth to seven: the second report of the national
383 child development study(1958 Cohort). London Longmans 1972;1:198.
384

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