Measurement
of
Individual Differences in
Online Newspaper Reading

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Every individual is endowed with certain distinctive characteristics which makes them unique. This uniqueness of personality influences human behavioural developments as well as their interactions with others. The study of individual differences provides an insight into the variations that exists in the behavioural pattern among individuals. So, behaviour is a key component in studying individual differences. Such differences can be based on psychological traits, personality traits, intelligence, values, etc. In 'The SAGE Glossary of the Social and Behavioral Sciences' individual difference is defined as "how individuals differ in traits such as skills, aptitude and abilities to learn and perform" (Sullivan, 2009)[1]. Other traits that were referred to include gender, race culture, age and educational background.

Individual differences can be traced in information behaviour. Information Behaviour is the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use (Wilson, 2000)[2].

Need of any information resulting from uncertainty due to a lack of understanding, gaping, meaning, or a limited construct (Kuhlthau, 1993)[3], results into information seeking.

Studies have revealed that information behaviour of individuals differ from one to one. Factors like age, gender, educational qualification, occupation, income and habitation all affects individuals' information need and their seeking behaviour. Differences are observed in their choice of information source also. To satisfy the information need, individuals' resort to seek information from various information sources.

One such source of information is 'Newspaper'. Newspaper is "a publication and form of mass communication and mass media usually issued daily, weekly, or at other regular times that provides news, views, features, and other information of public interest…"

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[1] Sullivan, L. E. (Ed.). (2009). Individual Differences. *In The SAGE glossary of the social and behavioral sciences*. doi: https://doi.org/10.4135/9781412972024.

[2] Wilson, T. D. (2000). Human information behavior. *Informing Science, 3*(2), 49-55.

[3] Kuhlthau, C. C. (1993). A principle of uncertainty for information seeking. *Journal of Documentation, 49*(4), 339-355.

(Newspaper, n.d.)[4].

Newspapers are an age-old primary source of information. From news on politics, business, society to sports, entertainment etc. it covers a large myriad of topics that can serve diverse information need of individuals. They are also a source of both historical and contemporary events. With the advent of the digital era the nature of newspaper has undergone massive changes. The printed newspapers are now accompanied by their online version. The increasing popularity of online newspapers has been attributed to its currency and interactive interface.

Majority of the study relating to online newspaper focused on its importance as a source of information, evaluation of its interface, its coverage of different topics and the habit of reading online newspapers among different sections of people. Works on online newspaper reading habit have ascertained the impact of socio-economic, demographic, educational factors on reading habit of online newspaper readers. However, the data interpreted in all those studies were group data. No work on individual differences in online newspaper reading was found.

As information need is specific to each individual so it becomes important to comprehend how individuals differ in their preferences in reading online newspaper while using it as a source of information. So, the question arises here is how to find individual differences in online newspaper reading and how to measure the differences.

Existing literary output shows little evidence on the questions raised. Therefore, a notable knowledge gap has been found in this regard.

2. Statement of the Problem and Research Questions

The problem of the proposed research can be stated as:

Identifying and Measuring Individual Differences in Online Newspaper Reading.

The problem stated above along with the following necessary and relevant research questions emerging there from warrants to be resolved in the course of investigation.

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[4] Newspaper. (n.d.). In *Encyclopedia Britannica*. Retrieved from
https://www.britannica.com/topic/newspaper

The research questions to this direction are as follows:

i. Is there any difference in individuals' reasons for preferring online newspaper? If yes, then to what extent one individual is different from another? What methodology can be applied in this regard?

ii. Is there any difference in individuals' choice of news categories in reading online newspaper? If yes, then to what extent one individual is different from another? How can this be determined?

iii. Is there any difference in individuals' choice of subject categories in reading online newspaper? If yes, then to what extent one individual is different from another? How can this be determined?

iv. Is there any difference in individuals' frequency of reading online newspaper? If yes, then to what extent one individual is different from another? What methodology can be applied in this regard?

v. Is there any difference in individuals' level of satisfaction in online newspaper reading? If yes, then to what extent one individual is different from another? What methodology can be adopted in this regard?

3. Objective

The objective of this research is to identify and measure the individual differences in online newspaper reading.

To fulfil this objective, the research attempted:

- To identify and measure individual differences regarding the reasons for preferring online newspaper;

- To determine and measure individual differences in choice of news categories in reading online newspaper;

- To determine and measure individual differences in choice of subject categories in reading online newspaper;

- To identify and measure individual differences in frequency of reading online newspaper;

- To identify and measure individual differences in level of satisfaction in online newspaper reading.

4. Methodology

To achieve the above stated objective, survey method had been employed. A brief outline of the overall methodology and the steps followed to carry out the research is given below:

At first, an attempt was made to select the sample from the target population. As to the population of the study every individual having the habit of reading online newspapers, belonging to diverse strata, across the world, should come under the purview of this research work. However, such population was so large and heterogeneous that it could not be covered in any study.

Therefore, for convenience, a representative sample of the population was selected from Kolkata district of West Bengal by using a stratified random sampling technique in combination with judgement sampling technique. However, the sample of the population was still large which could not be covered under the study. Hence, two Wards of Kolkata district were selected by applying judgement sampling technique. Under each of the Ward, fifteen individuals (who were found to be online newspaper readers) were selected as per availability and accessibility. In this way, a total of 30 individuals were selected as samples for conducting the survey.

It is worth mentioning that individuals under this sample might be selected by using different parameters like Age, Gender, Habitation, Occupation, Educational Qualification etc. However, for selecting individuals, 'Age' was set as the parameter judiciously for this study.

Under this parameter, individuals belonging to the age group of '25-34 years' were considered for selecting sample. This particular age group was chosen on the basis of web traffic analysis of four newspapers (two Bengali and two English) having the

highest circulation rate as per the report of Audit Bureau of Circulations, India (2019)[5]. The analysis was done using 'SimilarWeb' (https://www.similarweb.com/) and it revealed that the age group of 25-34 years had the highest reading rate for each of the selected newspapers viz: Times of India and The Hindu (leading English newspapers); Anandabazar Patrika and Bartaman (leading Bengali newspapers).

At second step, to gather the required data a structured questionnaire was framed (please see Appendix-1). Keeping in view the stated objective data collection was done from the selected sample using a combination of both questionnaire and interview method. Each individual was asked certain questions in statement form regarding five parameters:

    i.   Individuals' Reasons for Preferring Online Newspaper;

   ii.   Individuals' Choice of News Categories;

  iii.   Individuals' Choice of Subject Categories;

   iv.   Frequency of Reading; and

   v.   Level of Satisfaction.

Individuals were asked to score each of the statement on a scale of 0-10 where zero (0) denoted lowest score and ten (10) denoted highest score. After collecting the data, every individual was named in alphanumeric code viz. A1, A2, A3, A4…….....… A30 for ease of data representation and interpretation.

At the **third step**, to find out the degree of difference between two individuals, a mathematical formula was used. In this research, it was referred as 'Measurement of Pair Difference' formula. The formula is given below (with example):

Measurement of Pair Difference (in percentage)

$$x = \sqrt{\frac{(a_1 - b_1)^2 + (a_2 - b_2)^2 + \dots (a_n - b_n)^2}{N}} * \frac{100}{m}$$

Where $a_1, a_2 \dots \dots \dots a_n$ is score against choice of person A;

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[5] Audit Bureau of Circulations. (2019). Highest Circulated Dailies, Weeklies & Magazines amongst Member Publications (across languages). Retrieved from http://www.auditbureau.org/files/JD%202019%20Highest%20Circulated%20(across%20languages).pdf

$b_1, b_2 \ldots \ldots \ldots b_n$ is score against choice of person B;

N is the number of questions asked; and

m is the maximum number given for a question.

Example:

Two individuals named a_i and a_j were asked to give score from 0-10 for five questions.

Score of a_i = 5, 2, 10, 8, 6

Score of a_j = 9, 6, 4, 8, 10

By following the above formula, the pair difference is calculated below:

$$x = \sqrt{\frac{(5-9)^2 + (2-6)^2 + (10-4)^2 + (8-8)^2 + (6-10)^2}{5}} \ast \frac{100}{10}$$

$$= \sqrt{\frac{84}{5}} \ast \frac{100}{10}$$

$$= 40.9878031\%$$

$$= 40.99\%$$

So, the difference between a_i and a_j is 40.99%.

On the basis of the above formula an algorithm was made and a program in C language (see Appendix II) was compiled for calculating the difference between two individuals of a pair.

The **algorithm** is given below:

Compute x (a, n, N, m)

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Input a: as two-dimensional array of numbers

    n: number of data item

    N: number of questions asked

m: maximum score for a question

Output x, measure equality or difference

$x = 0$;

for (i = 1 to n)

{

  for (j = i + 1 to n)

  {

    $a^2_{ij} = 0$;   /* $a^2_{ij} = \| a_i - a_j \|^2$ */

      for (N = 1 to n)

        $a^2_{ij} = a^2_{ij} + (a_{in} - a_{jn})^2$;

        $x = x + a^2_{ij}$;

  }

}

$$x = \sqrt{\frac{x}{N}} * \frac{100}{m} \; ;$$

Return x;

}

Using the C programme, the results of Measurement of Pair Difference in all the parameters, viz: reasons for preferring online newspaper; choice of news categories; choice of categories of subject; frequency of reading; and level of satisfaction were calculated.

The rules followed for interpreting the results (denoted by x in the above algorithm) are given below:

if $x = 0$, then result of two pairs are equal i.e., perfect equality.

So, the result (calculated in percentage) revealed that there is no degree of difference between them.

if $x \neq 0$, then result of two pairs are not equal i.e., different.

So, the result (calculated in percentage) revealed the degree of difference to which they are different from each other.

At the **fourth** step, the Mean Absolute Deviation (MAD) was calculated under each parameter, using the results of Measurements of Pair Difference of all the thirty individuals in MS-Excel to determine the gravity of difference in online newspaper reading.

Formula of Mean Absolute Deviation:

$$\frac{\sum_{i=1}^{n}|x_i - \bar{x}|}{n}$$

Explanation:

x_i = Input data values

$\bar{x}$ = Mean value for a given set of data,

n = Number of data values

Example: A-B = 20, A-C= 30, B-C =25

So, $\bar{x}$ (mean value) = 25

$|x_i - \bar{x}|$		
A-B	A-C	B-C
5	5	0

Mean Absolute Deviation = A-B+A-C+B-C / 3

= 3.33

The Mean Absolute Deviation is 3.33. It indicates that among all the individuals the average difference is 3.33 from the mean (25).

So, the gravity of difference is 3.33.

At the **fifth step**, the results of the study were tested and validated using R statistical software. Additionally, a visual representation of the distribution of Measurement of Pair Difference results using a histogram has been provided for each parameter. For descriptive statistics, the R library {psych} was utilized, while {ggplot2} was used for plotting the histograms.

At the **final and sixth step**, keeping in view the objective of the study the collected data were analysed and interpreted.

5. Scope

With regard to the scope of the study, this research work should cover every individual having the habit of reading online newspapers, belonging to diverse strata, across the world. But it is neither possible nor convenient to cover such a huge heterogeneous population for the study. The current work is based on and limited to the opinions expressed by a total of thirty samples belonging to the 'Age' group of '25-34' years from the two selected Wards of Kolkata District of West Bengal, India.

6. Significance of the Study

This research has substantial significance in both the field of Library & Information Science and Information Behaviour. As newspaper has always been a primary source of information so understanding individuals' information behaviour towards 'online newspaper' will give an idea about the relevance and value newspapers still have as a source of information at present day. Also, measurement of individual differences will substantiate that the information need of every individual is different and therefore there is a need to provide personalised services to users by library and information professionals. It can even help to design and develop information system with special attention to single user / individual oriented service.

This study even has implications in the field of Media Science. The preferences of individuals in reading online newspaper, their choice of news categories, subject categories, frequency of online newspaper reading and level of satisfaction all can help a media professional to understand user attitude towards online newspaper and thereby improve their services. The study can also be helpful to the field of Psychology. To be able to measure individual difference will give the psychological professionals the

scope to understand each and every individual's behaviour is different and by measuring the difference between two individuals' attention can be given to the specific need of a person.

7. Style of Referencing

Guidelines of American Psychological Association, 6th ed., 2009 was followed here for citation of print and non-print materials in the text and for making list of references.

8. Chapters

Chapter-1 (**Introduction**) provides a brief outline of the research work that includes statement of problem of the research along with specified research questions, objective, methodology, scope, significance of the study and style of references.

Chapter-2 (**Overview of Literature**) reviews the literature in areas related to the problem of the research viz: Reading Habit, Newspaper Reading Habit, Individual Differences and Measurement of Individual Differences.

Chapter-3 (Individuals' Preferences for Reading Online Newspaper) identifies and measures the individual differences pertaining to the reasons behind their preferences for reading online newspaper.

Chapter-4 (Individuals' Choice of News Categories) determines and measures the individual differences in readers' choice for news categories as reflected in online newspaper.

Chapter-5 (Individuals' Choice of Subject Categories) determines and measures the individual differences in readers' choice of subject categories while reading online newspaper.

Chapter-6 (Frequency of Reading) identifies individual differences in readers' frequency of reading online newspapers and measures those differences.

Chapter-7 (Level of Satisfaction) identifies individual differences in the level of satisfaction of online newspaper readers and measures the differences.

Chapter-8 (Summary of Findings and Conclusion) deals with the summary of

findings and conclusion of the research. Areas of further research have also been suggested here.

9. Summary of Findings and Conclusion

9.1 Summary of Findings

The findings drawn from this research work are summarized below:

Parameter 1: Individuals' Reasons for Preferring Online Newspaper (vide Chapter 3)

- Individual differences exist in terms of preferences for reading online newspaper as the results of 'Measurement of Pair Difference' of all the pairs are in numbers; not in zero（435 pairs）.

- After analyzing the results of the 'Measurement of Pair Difference' it is found that the difference of the thirty individuals varies within the range of 16.17% to 69.28%.

- So, the extent of the difference in scores among individuals is not less than 16.17% as per individuals'' reasons for reading online newspaper.

- The Mean Absolute Deviation indicates that among all the individuals the average difference is 7.49 from the mean（40.77）.

- Therefore, the gravity of difference in terms of reasons for preferring online newspaper is 7.49.

- Histogram of 'Measurement of Pair Difference' results shows frequency wise distribution of pair difference results. It is evident from the distribution of pair difference values that all results are almost symmetrical, suggesting a normal

distribution. This is supported by the skewness value of 0.32 and the mean value of 40.77, which lies almost in the middle of the histogram.

Parameter 2: Individuals' Choice of News Categories (vide Chapter 4)

- Individual differences exist in terms of choice of categories of news in reading online newspaper as the results of 'Measurement of Pair Difference' of all the pairs are in numbers; not in zero（435 pairs）.

- After analyzing the results of the 'Measurement of Pair Difference' it is found that the difference of the thirty individuals varies within the range of 13.63% to 72.11%.

- So, the extent of the difference in scores among individuals is not less than 13.63% as per choice of categories of news.

- The Mean Absolute Deviation indicates that among all the individuals the average difference is 6.90 from the mean（38.36）.

- Therefore, the gravity of difference in terms of choice of categories of news in reading online newspaper is 6.90.

- Histogram of 'Measurement of Pair Difference' results shows frequency wise distribution of pair difference results. It is evident from the distribution of pair difference values that all results are almost symmetrical, suggesting a normal distribution. This is supported by the skewness value of 0.22 and the mean value of 38.36, which lies almost in the middle of the histogram.

Parameter 3: Individuals' Choice of Subject Categories (vide Chapter 5)

- Individual differences exist in terms of choice of categories of subjects in reading online newspaper as the results of 'Measurement of Pair Difference' of all pairs are in numbers; not in zero（435 pairs）.

- After analyzing the results of the 'Measurement of Pair Difference' it is found that the difference of the thirty individuals varies within the range of 20.33％ to 65.47％.

- So, the extent of the difference in scores among individuals is not less than 20.33％ as per their choice of subject categories in reading online newspaper.

- The Mean Absolute Deviation indicates that among all the individuals the average difference is 7.04 from the mean（44.29）.

- Therefore, the gravity of difference in terms individuals' choice of subject categories in reading online newspaper is 7.04.

- Histogram of 'Measurement of Pair Difference' results shows frequency wise distribution of pair difference results．It is evident from the distribution of pair difference values that all results are almost symmetrical, suggesting a normal distribution．This is supported by the skewness value of −0.06 and the mean value of 44.29, which lies almost in the middle of the histogram．

Parameter 4: Frequency of Reading Online Newspaper (vide Chapter 6)

- Individual differences exist in terms of frequency of reading online newspaper as the results of 'Measurement of Pair Difference' of all pairs are in numbers; not in zero（435 pairs）．

- After analyzing the results of the 'Measurement of Pair Difference' it is found that the difference of the thirty individuals varies within the range of 22.49％ to 62.54％.

- So, the extent of the difference in scores among individuals is not less than 22.49％ as per their frequency of reading online newspaper．

- The Mean Absolute Deviation indicates that among all the individuals the average difference is 6.29 from the mean（41.03）．

- Therefore, the gravity of difference in terms individuals' frequency of reading online newspaper is 6.29.

- Histogram of 'Measurement of Pair Difference' results shows frequency wise distribution of pair difference results. It is evident from the distribution of pair difference values that all results are almost symmetrical, suggesting a normal distribution. This is supported by the skewness value of 0.18 and the mean value of 41.03, which lies almost in the middle of the histogram.

Parameter 5: Level of Satisfaction in Reading Online Newspaper (vide Chapter 7)

- Individual differences exist in terms of level of satisfaction in reading online newspaper as the results of 'Measurement of Pair Difference' of are in numbers; not in zero（435 pairs）.

- After analyzing the results of the 'Measurement of Pair Difference' it is found that the difference of the thirty individuals varies within the range of 15.00% to 62.65%.

- So, the extent of the difference in scores among individuals is not less than 15.00% as per their level of satisfaction in reading online newspaper.

- The Mean Absolute Deviation indicates that among all the individuals the average difference is 6.27 from the mean（36.59）.

- Therefore, the gravity of difference in terms individuals' level of satisfaction in reading online newspaper is 6.27.

- Histogram of 'Measurement of Pair Difference' results shows frequency wise distribution of pair difference results. It is evident from the distribution of pair difference values that all results are almost symmetrical, suggesting a normal

distribution. This is supported by the skewness value of 0.03 and the mean value of 36.59, which lies almost in the middle of the histogram.

9.2 Conclusion

From the analysis of all the parameters, it is observed that differences exist among all individuals in online newspaper reading. The extent of the differences in scores for online newspaper reading among all individuals is at least 13.63%.

The minimum Mean Absolute Deviation across all parameters is 6.27, with a minimum mean value of 36.59 across all parameters. The gravity of difference in terms of online newspaper reading is therefore 6.27. It indicates that among all individuals, the average difference is 6.27 from the mean (36.59) in reading online newspaper.

The following aspects need consideration for further study and research in this connection:

- Measurement of individual differences in information behaviour for assimilation.
- Measurement of individual differences in reading comprehension.
- Measurement of variables of psychological make-up of the individuals and determining their impact on retrieval for assimilation.
- Measurement of variables of psychological make-up of individual nonusers and users of a formal retrieval system.