A STUDY ON INTERNET DEPENDENCY, SOCIAL ISOLATION AND PERSONALITY USING MAHALANOBIS DISTANCE

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ABSTRACT

With the advent of the globalised 21ˢᵗ century, hominids have metamorphosed to the credence and dependence on the internet. From education to shopping, there is a cumbersome dependence on this media. Yet, this rapid chrysalis of the Internet is unfortunate enough on the other side, since it bears a large impact on the human personality, coercing people to isolate from the social world. The present study accords with comparison among different psychological aspects of postgraduate level students with the help of Mahalanobis Distance. Different variables viz. Internet Dependency, Social Isolation and five different factors of Personality are considered for this study. Different groups like science and arts, male and female are formed for this study. Seven dependent variables like Internet Dependency, Social Isolation, Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness are taken as a branch for two dichotomous independent variables sex (male and female) and stream (arts and science) and Mahalanobis Distances are measured. It can be wrapped up on this note with a conclusion that there are no significant differences in dynamical nature between male and female students and arts and science students.

KEYWORDS: *Internet Dependency, Social Isolation, PG Level Students and Mahalanobis Distance.*

INTRODUCTION

The internet is esteemed for a colossal number of assistance that it caters to the global world. The varied uses of internet in the domains of- education, shopping, finance, communication, blogging etc, has not only restricted our lives but has also made us sabotaged into it. This over dependence on internet is robbing one of the socio-cultural lives, inducing social isolation and depression. Hence, this dependence has proved to be providing compelling aftermath on the behavioral, cognition and emotional patterns, which originally foster from the biological and environmental factors.

Internet Dependency, Social Isolation and factors of Personality are very much akin to each other. The first two variables mentioned above are both related with cause-effect relationship and vice-versa. The factors of personality have enormous influence on Internet Dependency and Social Isolation. Consistently, Dependency and Social Isolation might be the incitement of a changed Personality. So, it would be a better measure if one can measure the difference of these three dependent variables together for any set of independent variables.

Internet addiction disposes psychological as well as physiological conditions of the learners.

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Several investigations show that there are existence of different types of complications and obstacles (Kendell, 1998; Orzark, (1999); Yen, et al. 2007; Morrison and Gore, 2010; Yao and Zhong, 2014; Kelley and Gruber, 2013; Kuss, et al. 2014).

Personal characteristics and internet use was studied by different scholars (Tosun and Lajunen, 2010;Swickeret al. (2002); Muscanell and Guadagno, 2011).

Social isolation and internet enslavement are consociated to one another. Studies of different researchers shows that internet fixation is a cardinal cause of social isolation and physical illness (Seif et al.2014; Izanloo and Goudarzi, 2011;Tiwari and Ruhela, 2012; Malviya et al., 2014; Goel, et al. 2013). Taylor et al. 1979; Thoits, 1995;Cohen et al. 1997; Pressman et al. 2005; Hawkleyet al. 2003; Heikkinen and Kauppinen, 2004).

In Mahalanobis Distance, a measure of divergence or distance between two groups is used in terms of multiple characteristics. P. Mahalanobis projected this measure (Mahalanobis, 1936). Several researchers used this distance (Xiang et al. 2008; Bedrick et al. 2000; Rubin, 1980; Cochran and Rubin, 1973; Marty et al. 2007; Rosenbaum, 2015; Diedrichsen et al., 2016; Cristani and Murino, 2018; Toma, 2019; Etherington, 2019; Imani, 2019) for their studies.

The latest studies show that the distance is handled in the field of education to correlate two sets of disparate variables to analyze the difference by measuring the Mahalanobis Distance (Ahmed et. al. 2020; Sen and Pal, 2020).

Present work is an investigation to dig and treasure out the difference in Internet Dependency, Social Isolation and five different factors of personality for two groups of learners. By t-test we can compare one set of data with another one set of data where only one column or one row is present [in matrix notation $A_{1 \times N}$ or $A_{N \times 1}$] but by Mahalanobis Distance we can compare several set of data as a bunch with another several set of data as a bunch [in matrix notation $A_{M \times N}$]. This is an effective application of Mahalanobis Distance.

OBJECTIVES

Objectives of this study is to find out the difference in Internet Dependency, Social Isolation and five different factors of personality viz. Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness for two group of university level learners of Sidho-Kanho-Birsha University, Purulia, West Bengal, India. Three dependent variables are considered as a bunch and two such branches are compared. Mahalanobis distance is considered as a technique for analyzing the difference between scores obtained by different

groups of learner which is considered for more generalized reflection of results.

HYPOTHESES

Following hypotheses are considered to investigate the significance among variables considered for the study as listed below:

H_01:   There no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Extraversion.

H_02:   There is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Agreeableness.

H_03:   There is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Conscientiousness.

H_04:   There is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Neuroticism.

H_05:   There is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Openness.

H_06:   There is no significant difference between Male and Female students in terms of scores obtained in Internet Dependency, Social Isolation and Extraversion.

H_07:   There is no significant difference between Male and Female students in terms of scores obtained in Internet Dependency, Social Isolation and Agreeableness.

H_08:   There is no significant difference between Male and Female students in terms of scores obtained in Internet Dependency, Social Isolation and Conscientiousness.

H_09:   There is no significant difference between Male and Female students in terms of scores obtained in Internet Dependency, Social Isolation and Neuroticism.

H_010:   There is no significant difference between Male and Female students in terms of scores obtained in Internet Dependency, Social Isolation and Openness.

H_011:   There is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness.

H_012:   There is no significant difference between male students and female students in terms of scores obtained in Internet Dependency, Social Isolation, Extraversion,

Agreeableness, Conscientiousness, Neuroticism and Openness.

SAMPLE
250 PG students of Sidho-Kanho-Birsha University are taken as sample. The sample is collected by random sampling method.

TOOLS
Following tools are used for data collection.
- Internet Dependency Scale (IDS) by Mahanti et al. (2016)
- Social Isolation Scale (SIS) by Gorain et al. (2018)
- Big Five Inventory of Personality (BFI) by John et al. (1991)

METHODOLOGY
Following steps are followed for obtaining Mahalanobis Distance.
Step I: Formation of different groups of students
Step II: Calculation of descriptive statistics
Step III: Calculation of Mahalanobis Distance
We can obtain Mahalanobis Distance with the help of following equation.

$$\Delta^2 = (X - Y)^T \Sigma^{-1}(X - Y)$$ Where $X \ and \ Y$ are column vectors of means and Σ is pooled covariance matrix of two sets of data.

Mahalanobis Distance $= \left[(X - Y)^T \Sigma^{-1}(X - Y) \right]^{\frac{1}{2}}$

Pooled Covariance Matrix
$$\Sigma = \left[n_1 \Sigma_1 + n_2 \Sigma_2 \right] / \left(n_1 + n_2 \right)$$

Where Σ_1 and Σ_2 be the Covariance Matrices, n_1 and n_2 be the sample size for first and second set respectively.

We can classify the calculated MD into three categories as follows:
a. MD < 1: represents the distances are insignificant.
b. $1 \leq MD < 2$: represents the distances are significant.
c. $MD \geq 2$: represents the distances are strongly significant.
Here distance significant means the difference between performances for two sets of variables is significant.

RESULTS AND DISCUSSIONS
Different sets of data are prepared for calculating the distance. Arrangement of data sets is listed as below:

	Internet Dependency, Social Isolation and Extraversion	Internet Dependency, Social Isolation and Agreeableness	Internet Dependency, Social Isolation and Conscientiousness	Internet Dependency, Social Isolation and Neuroticism	Internet Dependency, Social Isolation and Openness
Arts	Set 1	Set 2	Set 3	Set 4	Set 5
Science	Set 6	Set 7	Set 8	Set 9	Set 10
Male	Set 11	Set 12	Set 13	Set 14	Set 15
Female	Set 16	Set 17	Set 18	Set 19	Set 20

Table 1: Arrangement of data for calculating Mahalanobis Distance

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Initial requirements for Mahalanobis Distance like frequency and mean are listed in Table 2.

	Number of Students	Internet Addiction	Social Isolation	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Arts	190	120.50	105.54	22.85	30.29	31.09	22.05	32.86
Science	60	127.78	102.77	22.82	30.25	30.47	21.03	32.95
Male	128	125.73	102.44	22.49	30.02	31.38	21.16	32.73
Female	122	118.59	107.43	23.21	30.56	30.48	22.48	33.04

Table 2: Descriptive statistics for different groups of students

Mahalanobis Distance	Internet Dependency, Social Isolation and Extraversion	Internet Dependency, Social Isolation and Agreeableness	Internet Dependency, Social Isolation and Conscientiousness	Internet Dependency, Social Isolation and Neuroticism	Internet Dependency, Social Isolation and Openness
Arts Vs Science	0.323767712	0.322658993	0.348734745	0.419142413	0.31486868
Male Vs Female	0.536842498	0.443664262	0.462242145	0.510418582	0.427118895

Table 3:Mahalanobis Distances for different group of students when three variables are considered

Mahalanobis Distances between two groups of students (Arts Vs Science and Male Vs Female) for three dependent variables are presented by Table 3. All the distances by rule are insignificant.

Testing of H_01 to H_010:
Here, all the Mahalanobis Distances are less than 1. So, there is no significant difference between Arts and Science students in terms of scores obtained in Internet Dependency, Social Isolation and Extraversion/ Agreeableness/ Conscientiousness/ Neuroticism/ Openness. So, all Null Hypotheses (H_01 to H_010) are retained.

Mahalanobis Distance	Internet Dependency, Social Isolation, Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness.
Arts Vs Science	0.5027
Male Vs Female	0.7411

Table 4:Mahalanobis Distances for different group of students when seven variables are considered.

Testing of H_011 and H_012

Table 4 shows the Mahalanobis Distances between arts vs science students and male vs female students when seven dependent variables are considered as bunch of variables. As Mahalanobis Distances are less than 1 for the above mentioned hypotheses, there is no significant difference between the arts and science learners when seven variables are considered together. So, H_011 is accepted. Similarly, significant difference is not found between male learners and female learners. As a result H_012 is also accepted.

Although there are some dependent variable-wise differences between male and female of PG level students but the dynamical nature of these two groups are not significantly different for internet addiction, social isolation and any one of personality trait. Similar result is also seen for internet addiction, social isolation and five of personality traits. Actually, majority of the sample are mainly come from a specific locality, Purulia district of West Bengal, India. Similarity of culture and social processes may be the basis of indifference.

Another important fact that there is no significant difference in dynamical nature between science and arts PG level students for internet addiction, social isolation and any one of personality trait. Similar result is also seen for internet addiction,

social isolation and five of personality traits. This point is quite interesting because the pattern of the study for arts and science students are quite different but in the light of for internet addiction, social isolation and personality, when considered as a bunch, are quite similar.

CONCLUSION

Mahalanobis Distance is a powerful measure of distance for dynamical nature of a group of variables and it is represented by a single number. In present work each of the distances are non-significant which shows behaviour of each pair of groups are similar. Although there are differences in dependent variables, dynamical nature of the groups is independent of sex and stream.

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