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EXPLORING CLUSTERING PATTERNS OF GENDER, STREAM OF STUDY, RESIDENCE, AND INTERNET ADDICTION USING TWO STEP CLUSTERING METHOD

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RESEARCH ARTICLE

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Abstract

The study: The present study is conducted on internet addiction in Birbhum district. 213 Higher Secondary students are taken as sample by simple random sampling.

Methodology: Descriptive survey method is followed for the present work. Two step clustering technique is used to categorize students.

Findings: Seven clusters were formed. Gender, residence and stream of study were the major predictors of the clusters.

Keywords: *Two Step clustering, Internet Addiction, Gender, Stream of study, Descriptive Survey, Higher Secondary Level*

Introduction

Internet addiction poses a significant challenge for individuals, particularly adolescents. It describes a struggle to manage internet usage, leading to excessive online time and social difficulties, resembling characteristics of other addictions, which can create issues in relationships, family interactions, and social connections (Bailin et al., 2014). Up to half of teenagers claim to feel addicted to social media, and 59% of parents agree with them (Dealing with Devices: The Parent-Teen Dynamic, 2016). Internet addiction among adolescents has been linked to multiple problems, such as depression, self-harming behavior, sleep disturbances, higher consumption of alcohol and tobacco, and obesity, much of which has been discussed earlier in this article (Bailin et al., 2014). Additionally, studies indicate that adolescents struggling with internet addiction may undergo micro-structural alterations in the brain, which include decreased gray matter volume and changes in neurotransmitter levels (Yuan et al., 2011). One particular cohort study suggests that regular social media use during early adolescence might be associated with enduring changes in brain responses to social rewards and punishments, which could impact psychological health (Maza et al., 2023).

Literature Review

Rajeswari et al. (2017) carried out a study focusing on Internet Addiction among undergraduate students. The aim of the research was to evaluate the extent of internet addiction within this demographic. Employing a non-experimental descriptive cross-sectional research design, the findings showed that 49% (98) of undergraduate students exhibited mild addiction, 28.5% (57) experienced moderate addiction, and 0.5% (1) were severely addicted, while 22% (44) displayed no signs of addiction. Nellitawati et al. (2018) performed a study regarding Internet Addiction among college students enrolled in educational administration programs through network psychometric analysis. This study aimed to investigate the level of internet addiction among these students. The research utilized an experimental method, and the results indicated that network psychometric data analysis revealed strong interactions among factor structures. According to this network psychometric analysis, the outcomes can provide valuable insights for the academic community and serve as a foundation for future research. Menon et al. (2018) executed a study examining the Internet Addiction of college students in India, intending to explore this issue among Indian college students. The researchers adopted a survey methodology for their design. The results demonstrated a significant correlation between age and internet addiction, with older students showing higher levels of addiction to the Internet compared to their younger counterparts. Nitu (2017) investigated the prevalence of Internet Addiction among college students, focusing on determining its prevalence within varied sample groups, assessing the level of internet addiction, and analyzing how gender influences it. The sampling method utilized was stratified random sampling, and Young's Internet Addiction Scale was employed for data collection. Statistical analyses were performed using percentage analysis, means, standard deviation, and t-

tests. Analysis revealed that the prevalence of Internet Addiction among undergraduate students stood at 13.33%. The average score for boys was 33.7%, while for girls, it was 33.5%. The study concluded that there was no significant impact of gender on Internet Addiction. Sushma et al. (2018) conducted research to assess internet addiction levels among undergraduate medical students at MMC & RI in Mysore. The aim was to evaluate Internet Addiction among these students using Young's Internet addiction test. A cross-sectional observational study was executed from August to November 2015, involving 236 students. Kimberly Young's Internet Addiction test was used to gauge the level of addiction. The mean age of participants was 20.6 years (SD 1.97), and they had an average duration of internet use of 4.4 years (SD 1.64), spending an average of 1.96 hours online daily (SD 0.99). The study identified the prevalence rates of severe internet addiction, moderate addiction, and mild addiction as 0.8%, 19.5%, and 58.2%, respectively. Pedagogical Content Knowledge (PCK) is a crucial topic in educational research, with multiple studies conducted on PCK by Sen and Samanta (2015a; 2015b; 2015c; 2015d) and Sen (2016). Chakrabarty and Saha (2014) performed a study focused on achievement analysis.

Several researchers conducted their researches in education by using several statistical techniques like clustering techniques [Sen et al. (2023); Mohanta et al. (2023a); Ansary et al. (2023); Saha et al. (2021); Adhikari et al. (2023); Mohanta et al. (2023b); Adhikari and Sen (2023)], Mahalanobis Distance [Sen and Pal (2020); Mahato and Sen (2021); Sen et al. (2023a); Ahmed et al. (2022); Mohanta et al. (2023); Adhikari (2023)], t-test [Adhikari (2023); Adhikari et al. (2023); Pal (2024), Mahanti et al. (2016); Mahato and Sen (2021a); Saha (2012b); Mahanti et al. (2016); Mondal and Saha (2017); Mondal et al. (2018); Saha (2021); Sen et al. (2013); Mondal and Saha (2013); Khatun et al. (2022); Karmakar et al. (2016); Ansary et al. (2022); Sen and Kar (2014); Kar and Sen (2014)], correlational studies [Adhikari et al. (2023); Mahato et al. (2023); Sen & Samanta (2013); Sen et al. (2023b); Mondal and Saha (2017); Saha (2012a); Saha (2013); Sutradhar and Sen (2022b); Sutradhar et al. (2023); Gayen et al. (2023); Gayen and Sen (2021); Mahato and Sen (2023); Kar and Saha (2021a); Kar and Saha (2021b)] and non-parametric tests [Haldar et al. (2022); Sutradhar and Sen (2022a); Adhikari and Saha (2021); Adhikari et al. (2023); Mahato et al. (2022); Sen et al. (2021)].

The present study is conducted to group the students with respect to Internet Addiction, gender of the students, residence of the students and stream of study of the students of Birbhum district of West Bengal, India.

Objective of the study: Objective of this study was to categorize students according to Internet Addiction, gender of the students, residence of the students and stream of study of the students.

Methodology

Research Methods: This study employed a descriptive survey method.

Research Variable: The primary variable under investigation is Internet Addiction, along with demographic factors such as gender, academic stream, and locality.

Population: The participant group for this study comprises all higher secondary students enrolled in Higher Secondary schools associated with WBCHSE in the Birbhum district of West Bengal.

Sample and Sampling Technique: The study will involve a sample size of 200 participants, selected through a simple random sampling method.

Tools Used: The assessment tool utilized is the Internet addiction test scale developed by Young (1998).

Software used: The gathered data will be processed using Two Step clustering with the help of SPSS version 20.

Results and Discussions

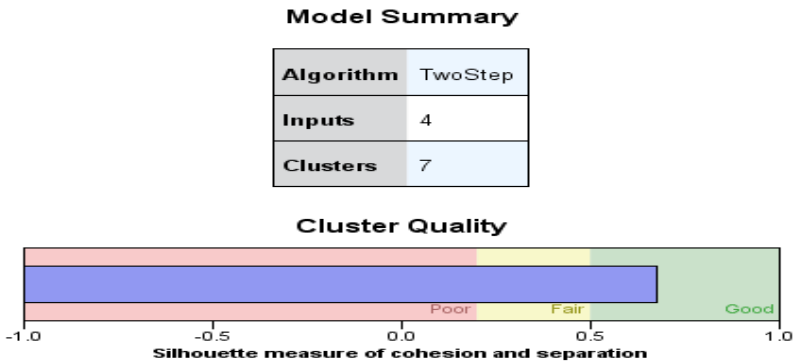

Figure 1: Model summary for cluster formation

Two Step algorithm is followed for determining the cluster. From Figure 1, it was observed that Silhouette value is greater than 0.5. According to Silhouette vale, it may be opined that quality of the cluster formation is good.

Cluster	2	7	5	3	6	4	1
Label							
Description							
Size	19.2% (41)	16.4% (35)	16.0% (34)	15.0% (32)	12.7% (27)	11.3% (24)	9.4% (20)
Inputs	Gender Boys (100.0%)	Gender Boys (100.0%)	Gender Girls (100.0%)	Gender Girls (100.0%)	Gender Boys (100.0%)	Gender Girls (100.0%)	Gender Boys (100.0%)
	Stream Arts (100.0%)	Stream Arts (100.0%)	Stream Arts (100.0%)	Stream Arts (100.0%)	Stream Science (100.0%)	Stream Science (100.0%)	Stream Science (100.0%)
	Locality Urban (100.0%)	Locality Rural (100.0%)	Locality Rural (100.0%)	Locality Urban (100.0%)	Locality Rural (100.0%)	Locality Urban (54.2%)	Locality Urban (100.0%)
	IA 30.56	IA 25.74	IA 22.76	IA 22.44	IA 28.67	IA 29.67	IA 35.55

Table 1: Representation of variables for different clusters

There are seven clusters formed following Schwarz's Bayesian Criterion (BIC) with Log-likelihood distance measure. Four and three clusters were formed by boys and girls respectively. Boys of the science stream formed two clusters according to their residence. Boys students of science stream residing at rural area formed a cluster (Mean IA score = 28.67). Another cluster was formed by boys students of science stream residing at urban area (Mean IA score = 33.55). Here, urban boys of science stream had greater IA. Boys of the arts stream formed two clusters according to their residence. Boys students of arts stream residing at rural area formed a cluster (Mean IA score = 25.74). Another cluster was formed by boys students of arts stream residing at urban area (Mean IA score = 30.56). Here, urban boys of arts stream had greater IA. Girls of the arts stream formed two clusters according to their residence. Girls students of arts stream residing at rural area formed a cluster (Mean IA score = 22.76). Another cluster was formed by girls students of arts stream residing at urban area (Mean IA score = 22.44). Here, both rural and urban girls of arts had similar IA. Girls students of science stream were placed in a separate cluster.

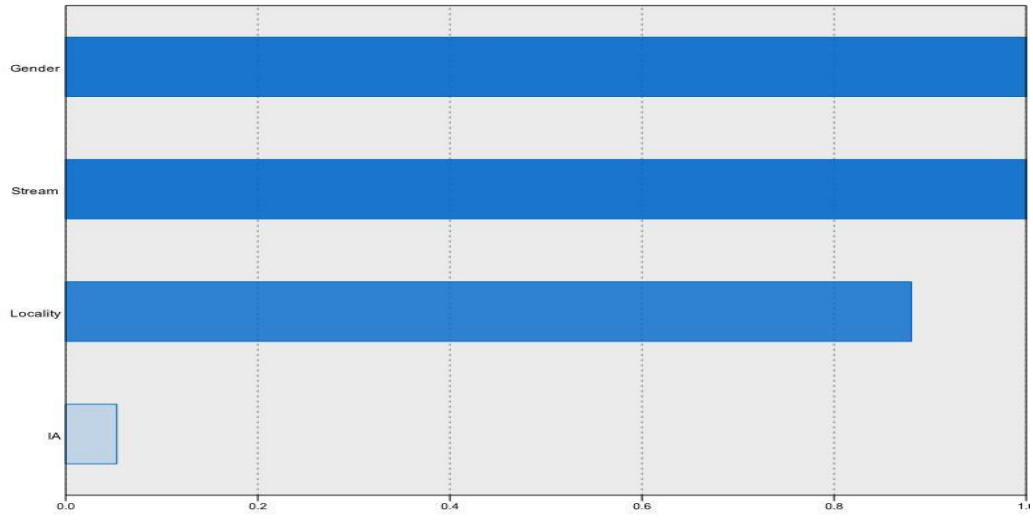

Figure 2: Predictors of clustering

For formation of clusters, gender and stream of study were the very high level of predictors. Locality was also a high level of predictor. IA played negligible role for formation of clusters.

Conclusion

Clusters were created based on the primary influences of gender, field of study, and student residence. The characteristics of the clusters formed by higher secondary students varied according to gender, field of study, and residence. Distinct differences were evident between male and female students, as well as between arts and science students.

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