A Statistical Analysis of Telecommunication Network Usage among College Students in Southern Tamil Nadu, India

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Abstract—**This study presents a statistical analysis of telecommunication network usage among college students in a district of Tamil Nadu, India. The research examines SIM card preferences, network quality, service satisfaction, mobile internet usage, and digital behavior across a sample of undergraduate, postgraduate, and research students from various academic streams.**

Findings indicate that Jio is the most widely used network, followed by Airtel and Vi. Most respondents are aged 20–24 and primarily from arts and science backgrounds. Single SIM cards and 28-day prepaid plans are widely preferred. Entertainment and education are the top purposes for SIM usage. Airtel and BSNL users report the longest SIM usage, while Vi and BSNL users face more call drops and data issues. Most students access 4G networks, with Jio leading in 5G adoption.

We used non-parametric Kruskal-Wallis tests due to normalcy violations. No significant associations were found between SIM usage and gender, academic stream, or program. However, network speed showed a significant correlation with downloading academic materials.

The study highlights college students' reliance on mobile networks for academic and personal use, revealing performance gaps across providers. These insights can guide telecom providers and policymakers to improve mobile service accessibility and quality

Index Terms—**SIM usage, mobile networks, telecom service quality, Kruskal-Wallis, data connectivity, digital behavior**

I. INTRODUCTION

Telecommunication has transformed significantly since its inception, evolving from the invention of the telegraph and telephone in the 19th century to today's complex and high-speed digital networks. With the advent of mobile technology in the late 20th century, people began to move away from fixed-line systems, ushering in a new era of connectivity. Over time, mobile phones became more accessible, affordable, and multifunctional, significantly influencing communication, education, and lifestyle. The widespread adoption of the internet further accelerated this transformation, turning telecommunication into a multidimensional platform for voice, video, and data exchange across the globe.

The Indian telecom industry, one of the largest in the world, has played a pivotal role in this evolution. Companies like Airtel, Vodafone Idea, Reliance Jio, and BSNL have expanded their services to include affordable voice and data plans, leading to mass mobile adoption, especially among youth. With the introduction of 4G and the upcoming 5G networks, the telecom sector is at the cusp of another major shift. The promise of 5G—ultra-fast internet, low latency, and massive connectivity—opens new opportunities in education, entertainment, and digital transactions.

This study focuses on the usage patterns, satisfaction levels, and impacts of telecom services among college students in Southern Tamil Nadu, India. It investigates how students interact with various service providers, their preferences in prepaid or postpaid plans, their engagement with mobile apps for learning and payments, and the role of 5G awareness in shaping their expectations.

Objectives
- ✓ To assess customer satisfaction with various mobile network service providers.
- ✓ To evaluate user experiences with network speed, signal quality in colleges, call clarity, SIM security, and customer support.

- ✓ To identify students' monthly expenditure on telecom services and mobile data.
- ✓ To analyze the level of awareness and adoption of 5G technology among students.
- ✓ To determine the most common fields and purposes for which students use mobile data.
- ✓ To examine the time spent and applications used by students for academic purposes.
- ✓ To study the use of e-payment applications and the transaction efficiency with different networks.

This research aims to bridge the gap between service providers and young consumers, helping to inform strategies that enhance network quality, affordability, and digital inclusion.

II. REVIEW OF LITERATURE

Telecommunication networks have become integral to the lives of college students, supporting communication, learning, and daily activities. Numerous studies have investigated various aspects of telecom service usage, satisfaction, and customer behavior, providing useful insights into network selection and user experience among students and general consumers.

Nkuah et al. (2015) found that overall satisfaction with telecommunication services varied across different providers, with entertainment and internet services having less influence on user preferences in Wa Township. Suguanthi and Shanthi (2017) emphasized the importance of responsiveness in customer service, using structured questionnaires to assess consumer expectations. Boobalan and Jayaraman (2017) studied Reliance Jio users and highlighted that customer satisfaction can be increased through friendly service, with users often influenced by personal treatment and available alternatives. Renuka and Arutgeevitha (2018) discussed the shift in organizational focus from profit to customer satisfaction, especially in rural areas, where improvements in broadband and 4G technology have enhanced educational access. Manam et al. (2019) provided a historical overview of wireless communication, noting the progression from 1G to 5G and its relevance to modern data transmission needs. Muruganandam and Veerappan (2020) concluded that consumer brand choice is often driven by personal preferences and perceptions, influenced by marketing and user experience.

Rout and Gupta (2021) explored the internet's role in business and communication, highlighting its impact on customer service, decision-making, and global interaction. Their study used graphical tools to assess user satisfaction in the digital space. Chaudhari et al. (2023) focused on Vodafone users in Vadodara and found that demographic factors like age and gender had minimal impact on satisfaction, although usage habits shaped expectations. Mishra and N. (2023) identified fast data speeds and strong coverage as key drivers of satisfaction for Airtel users, recommending enhanced customer support through staff training.

Overall, the literature reveals that responsiveness, internet speed, customer support, and technological adaptability significantly influence telecom usage and satisfaction, forming a foundation for the current study on college students in Southern Tamil Nadu, India.

III. RESEARCH METHODOLOGY

This study investigates the usage and satisfaction levels of mobile network service providers among college students in Southern Tamil Nadu, India. Primary data was collected using a structured questionnaire distributed directly to students, yielding a total of 235 valid responses. Convenience sampling, a non-probability method where readily available participants are selected, was employed for data collection.

Section 3.1 – Data Collection & Sampling

Data was collected through a questionnaire-based survey using the convenience sampling method. The sample size for the study is 235 college students.

Section 3.2 – Data Representation

Data analysis was conducted using SPSS Version 27.0 and Microsoft Excel 2019 for visual representation and statistical output.

Section 3.3 – Statistical Tools Used

The study utilized both descriptive and inferential statistical techniques, including:

Percentage Analysis: Used to summarize categorical responses and show proportions.

Bar Charts, Pie Charts, Line Graphs: For graphical representation of data trends and comparisons.

Chi-Square Test: A non-parametric test to evaluate the independence between categorical variables,

requiring sufficient sample size and independence of observations.

Kruskal-Wallis Test: A non-parametric alternative to one-way ANOVA, used to determine if there are statistically significant differences between the medians of three or more independent groups.

This methodological framework enables a comprehensive analysis of student telecom usage, satisfaction, and service provider performance across key statistical dimensions

IV. DATA ANALYSIS AND INTERPRETATION

The Data Analysis and Interpretation is essential for uncovering insights from the collected data. It examines the usage patterns of various telecommunication networks among college students. This section outlines the statistical methods used and interprets the results meaningfully.

4.1 Percentage Analysis for Gender

Table: 4.1

	Classification	Number of Respondents	Percentage
Gender	Male	115	48.9%
	Female	120	51.1%
	Total	235	100%

According to Table 4.1 out of a total of 235 respondents, 120 (51.1%) were female students, while 115 (48.9%) were male students. This indicates a slight predominance of female respondents over male respondents in the collected sample.

4.2 Percentage Analysis and Age category

Table: 4.2

Age	Number of Respondents	Percentage
15-19	90	38.8%
20-24	137	58.3%
25+	8	3.4%
Total	235	100%

According to Table 4.2 out of the total respondents, 90 (38.8%) fell within the age group of 15 to 19, 137 (58.3%) were aged between 20 and 24, and 8 (3.4%) were aged 25 and above. The highest number of respondents, therefore, belonged to the age group of 20 to 24.

4.3 Respondents of different Graduates
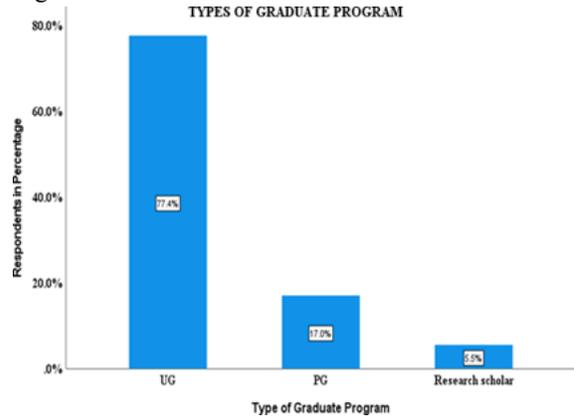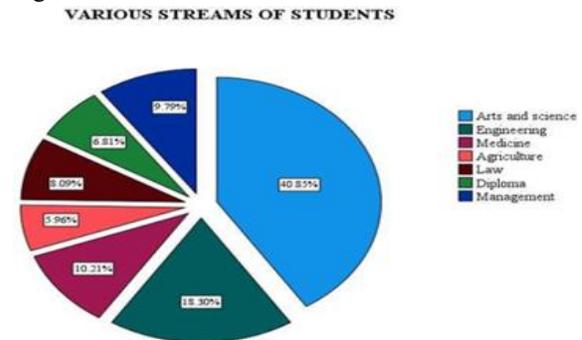
Figure: 4.1

Figure 4.1 illustrate the distribution of respondents by graduate type. Among the respondents, 77.45% were identified as undergraduate (UG) students, comprising 82 male respondents and 100 female respondents. Additionally, 17.02% were classified as postgraduate (PG) students, consisting of 24 male respondents and 16 female respondents. Lastly, 5.53% were categorized as research scholars, encompassing 10 male respondents and 3 female respondents.

4.4 Distribution by Academic Streams

Figure: 4.2

The Figure 4.2 delineates the classification of respondents across various streams. Among these, 40.85% of respondents originate from Arts and Science streams, 18.30% from Engineering streams, 10.21% from Medicine streams, 5.96% from Agriculture streams, 8.09% from Law streams, 6.81% from Diploma streams, and 9.79% from Management streams. In particular, the Agriculture streams exhibit the fewest respondents, while the Arts and Science streams boast the highest number of respondents. Furthermore, in comparison to Law streams, Medicine streams demonstrate a greater number of respondents. There are slight discrepancies between the Law streams and the Management

streams.

4.5 Preferred Telecommunication Services

Figure: 4.3

Respondents' distribution by network provider
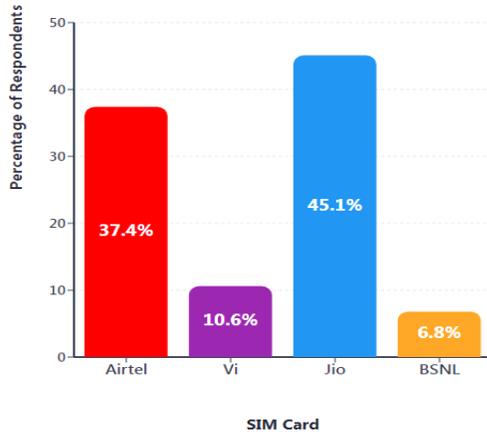
The Figure 4.3 depicts the telecommunication services preferences among college students across various streams. Among these preferences, 45.11% of students choose Jio SIM cards, 37.45% prefer Airtel SIM cards, 10.64% favour Vi SIM cards, and 6.81% choose BSNL SIM cards. Particularly, Jio SIM card users constitute the largest proportion, while BSNL SIM card users represent the smallest fraction. Furthermore, Airtel SIM card users outnumber Vi SIM card users.

4.6 Types of connections

Table: 4.3

Type of Connections			
Gender	Pre-paid	Post-paid	Total
Male	51%	40%	49%
Female	49%	60%	51%
Total	82%	18%	100%

Table 4.3 illustrates the distribution of different types of connections among respondents, categorized by gender. Predominantly, respondents utilize pre-paid SIM cards, with fewer opting for post-paid options. Analysis across genders reveals that male respondent (51%) favour pre-paid SIM cards slightly more than female respondents (49%). Conversely, post-paid SIM card usage is higher among female respondents (60%) compared to male respondents (40%). Students' desire for pre-paid SIM cards appears to be influenced by

convenience.

## 4.7 The Analysis of Single and Dual SIM Card Users

Table: 4.4

Streams	Single and Dual SIM Card Users	
	1	2
Arts and science	78 (43.82%)	18 (31.57%)
Engineering	38 (21.34%)	5 (8.77%)
Medicine	15 (8.42%)	9 (15.78%)
Agriculture	10 (5.61%)	4 (7.01%)
Law	14 (7.86%)	5 (8.77%)
Diploma	10 (5.61%)	6 (10.52%)
Management	13 (7.30%)	10 (17.54%)
Total	178 (75.74%)	57 (24.25%)

Table 4.4 reveals the single and dual SIM usage among college students. Out of 235 respondents, 75.74% are most likely to prefer only the single SIM card, whereas the remaining 24.25% are using the dual SIM card. The Management students prefer both single and dual SIM cards equally. The minimum percentage of a single SIM is 5.61%, which denotes the Agriculture stream and Law stream, and the minimum percentage of a dual SIM is 7.01%, which denotes the Agriculture stream, and the dual SIM is 8.77%, which denotes the Engineering and Law streams. When compared to different streams, there is less variation in the Law stream, where both single (7.8%) and dual (8.7%) SIM are almost identical to the other streams. Variations are more visible in the Arts and Science streams, with a percentage of single (43.8%) to that of dual (31.5%) SIM, and in the Engineering stream, a percentage of single (21%) to that of dual (8.7%) SIM compared to the other streams in the table.

4.8 SIM Card Services

Figure: 4.4
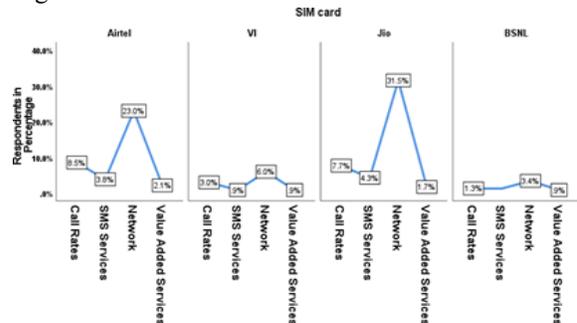
The Figure 4.4 reveals insights into the various services provided by SIM cards. Particularly, the BSNL SIM card exhibits the lowest percentage of

call rate services (1.3%), whereas the Airtel SIM card demonstrates the highest percentage of call rate services (8.5%). Specifically, within the BSNL SIM card, both call rates (1.3%) and network (3.4%) services exhibit the lowest percentages. Across all services, the Jio SIM card emerges as the preferred choice among the majority of respondents.

Overall, the data suggests that Jio SIM card is the preferred choice among respondents, followed by Airtel, while Vi and BSNL SIM card hold smaller shares of the market. These findings provide valuable insights into the distribution of SIM card services among respondents in the study.

4.9 Performance of SIM card
Figure: 4.5

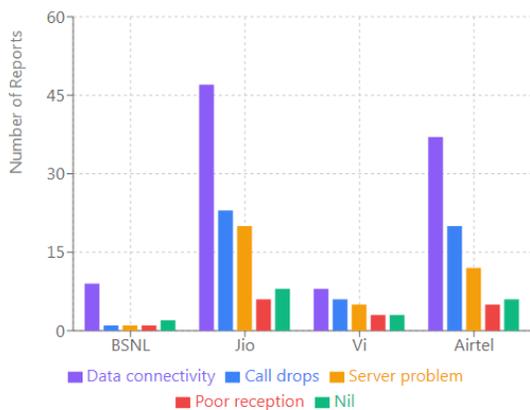Overall Performance Distribution (Total: 235 users)
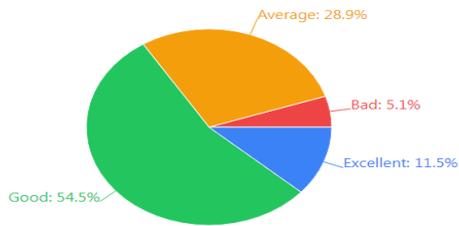
The figure 4.5 shows that 66% of users rate their SIM performance as "Good" or "Excellent", with only 5.1% reporting "Bad" performance across all providers.

4.10 Issues faced by the Respondents
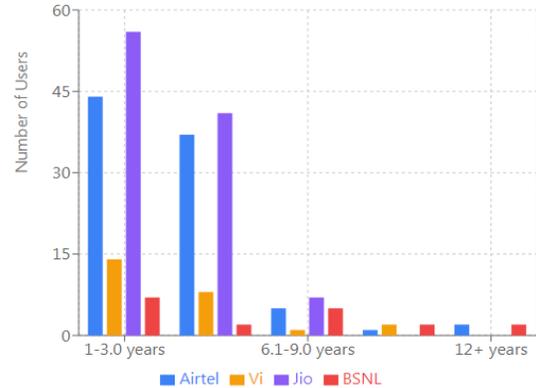Figure: 4.6

Issue Distribution by Provider

Based on the data presented in Figure 4.6 which outlines data connectivity issues dominate across all providers (45.3% of all reports), with Jio showing the highest absolute number of connectivity issues (47 reports).

4.11 Consistency of SIM card
Figure: 4.7

Usage Period Distribution by Provider

The Figure 4.7 illustrates nearly 90% of users have been using their current SIM for less than 6 years, indicating relatively recent adoption patterns. Jio and Airtel dominate across all usage periods, with Jio showing particularly strong presence in the 1-3 year category (56 users).

4.12 Validity of Recharge Packs
Table 4.5

Provider	28-days	56-days	84-days	90-days	365-days	Total
Airtel	62.5%	10.2%	21.6%	4.5%	1.1%	88
Vi	64%	20%	16%	0%	0%	25
Jio	57.5%	12.3%	24.5%	2.8%	2.8%	106
BSNL	68.8%	6.3%	12.5%	12.5%	0%	16

Short-term plans dominate the market with 82.6% of users choosing 28-day or 84-day validity periods. Monthly plans (28-days) are preferred by nearly 2 out of 3 users across all providers, indicating a preference for flexible, short-term commitments.

4.13 The different purposes of using SIM Cards
Figure: 4.8

Data Usage Purpose Distribution
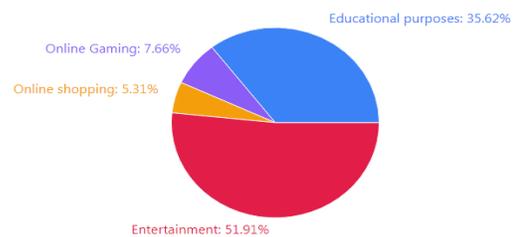
The Figure 4.8 displays the various purposes for which respondents use SIM cards. Among these purposes, 51.91% of respondent's choose for entertainment, while 33.62% choose educational purposes. Additionally, 7.66% utilize SIM cards for online gaming, and 6.81% for online shopping. It is evident that entertainment emerges as the most preferred purpose among respondents, followed by educational pursuits. Furthermore, there is a higher preference for educational purposes compared to online gaming. Specifically, the least number of respondents prioritize online shopping as a purpose for using SIM cards.

4.14 Amount spent for the Recharge Plan
Table: 4.6

Aspect	Male	Female
Primary spending range	0-500 rupees	300-700 rupees
Peak spending amount	200-300 rupees	400-500 rupees
Distribution pattern	Concentrated, narrow	Dispersed, wider
High-value spenders	Very few (>500)	Notable presence (up to 1500+)
Overall tendency	Lower spending	Higher spending

The Table 4.6 illustrates the expenditure on recharge plans by respondents, categorized by gender. Predominantly, both male and female respondents favor recharge plan amounts ranging from Rs. 200 to Rs. 500. Particularly, more than 30 female respondents allocate their recharge expenditure within the Rs. 200 to Rs. 500 range. Additionally, it is evident that female respondents tend to spend more than male respondents within the Rs. 200 to Rs. 500 range.

4.15 Customer care usage by Respondents
Table: 4.7

SIM card	Customer Care		Total
	Yes	No	
Airtel	(26) 29.5%	(62) 70.5%	(88) 100.0%
Vi	(10) 40%	(15) 60%	(25) 100.0%
Jio	(34) 32.1%	(72) 67.9%	(106) 100.0%
BSNL	(6) 37.5%	(10) 62.5%	(16) 100.0%
Total	(76) 32.3%	(159) 67.7%	(235) 100.0%

Table 4.7 shows that customer care usage varies across telecom providers. Airtel and Vi users use customer care services at 29.5% and 40%, respectively. Jio and BSNL users use them at 32.1% and 37.5%. However, a larger proportion of users, ranging from 60% to 70.5%, do not use them. This indicates that while some users do use customer care, there is still a significant percentage who do not, suggesting potential areas for improvement in customer care accessibility or effectiveness.

4.16 Type of Network Users
Table: 4.8

SIM card	Types Of Network User				Total
	5G	4G	3G	2G	
Airtel	(12) 13.6%	(75) 85.2%	(1) 1.1%	(0) 0.0%	(88) 100%
Vi	(0) 0.0%	(25) 100%	(0) 0.0%	(0) 0.0%	(25) 100%
Jio	(32) 30.2%	(72) 67.9%	(2) 1.9%	(0) 0.0%	(106) 100%
BSNL	(0) 0.0%	(0) 0.0%	(15) 93.8%	(1) 6.3%	(16) 100%
Total	(44) 18.7%	(182) 77.4%	(9) 3.8%	(0) 0.0%	(235) 100%

Based on the data presented in Table 4.8 it is evident that the types of network users vary among different telecom providers. Airtel and Jio have users across all network types, with the majority using 4G networks. Specifically, 85.2% of Airtel users and 67.9% of Jio users are on 4G networks. Additionally, Jio has a significant portion of users on 5G networks (30.2%). BSNL users predominantly use 3G networks (93.8%). Notably, Vi users exclusively utilize 4G networks. Overall, the data suggests that 4G networks are the most commonly used among respondents, highlighting the widespread adoption of this technology across telecom providers.

4.17 Mobile Apps for various SIM cards:
Table: 4.9

Gender	Yes	No
Male	53.5%	38%
Female	46.5%	62%
Total	72%	28%

Table 4.9 illustrate the usage of mobile applications among respondents according to their gender and SIM brand. It is revealed that 72% of respondents utilize mobile applications related to their SIM card, with 53.5% being male and 46.5% female. Conversely, 28% of respondents do not use mobile applications, with 38% being male and 62% female. This analysis suggests that the majority of respondents, particularly male students or respondents, utilize mobile applications associated with their SIM brand.

4.18 Various Apps Based on SIM cards
Table: 4.10

Various Apps Based on SIM cards	Frequency	Percentage
Airtel Thanks	65	27.7%
Vi	17	7.2%
My Jio	78	33.2%
BSNL Self-care	10	4.3%
Nil	65	27.7%
Total	235	100.0%

The data presented in the Table 4.10 illustrates the distribution of preferred mobile service apps among users. It is evident that "My Jio" is the most popular choice among users, with 78 individuals, constituting 33.2% of the total sample, opting for this app. "Airtel Thanks" also garners considerable usage, with 65 users, comprising 27.7% of the sample, indicating its popularity among consumers. Additionally, "Nil" represents a significant portion, with 65 users (27.7%), suggesting that a notable segment of users may not prefer any specific mobile service app. "Vi" and "BSNL Self-care" are less frequently chosen, with 17 (7.2%) and 10 (4.3%) users, respectively. These findings underscore the diverse preferences among users regarding mobile service apps, highlighting the importance for service providers to offer versatile and user-friendly app options to cater to varying consumer needs and preferences.

4.19 Various ports of connecting internet
Figure: 4.9

Ethernet (61.7%) ● No use of network (28.09%)
Modem (6.38%) ● Hotspot (3.83%)
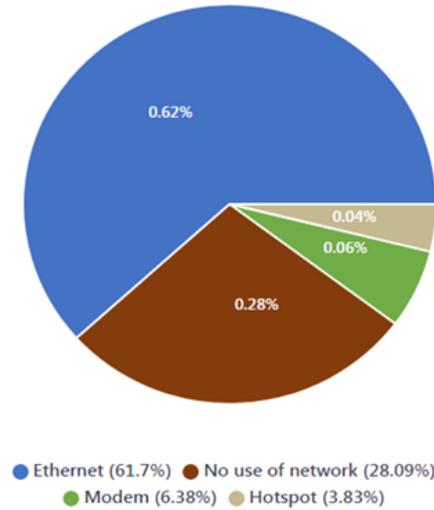
Distribution by Connection Type
Figure 4.9 illustrates the distribution of network usage methods among respondents. It is evident that the majority of respondents, constituting 61.7% of the total, utilize the "Hotspot" feature for network connectivity. "No use of network" represents a substantial portion, with 66 respondents (28.1%) indicating that they do not use any network connection method. Alternatively, "Modem" and "Ethernet" usages are less common, with 15 (6.4%) and 9 (3.8%) respondents, respectively. These findings suggest a predominant reliance on hotspot functionality for network access, highlighting the significance of mobile data sharing among respondents.

4.20 Time Spend by the Respondents in Mobile for Studies
Figure: 4.10
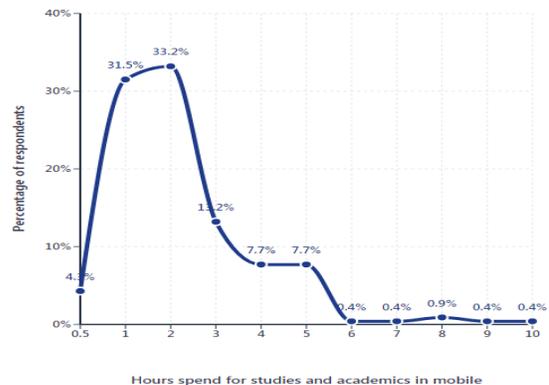
The Figure 4.10 displays the distribution of the time users spend on studies and academics using mobile

devices. The majority of users spent either 1 hour (31.5%) or 2 hours (33.2%) on their academic activities. A smaller proportion allocate 3 hours (13.2%), while fewer users spend 4 to 5 hours (7.7% each). Minimal percentages are observed for longer durations, with only a few individuals dedicating 6 to 10 hours. Overall, the data indicates that a substantial portion of users prefer to engage in their academic endeavors for short to moderate durations using mobile devices.

4.21 Different types of graduate programs and Apps using for studies

Table: 4.11

Graduate programme	Apps using for studies				Total
	Google/Chrome	YouTube	Chat GPT	Linked in	
UG	(72) 39.6%	(57) 31.3%	(46) 25.3%	(6) 3.3%	(182) 100.0%
PG	(23) 57.5%	(9) 22.5%	(5) 12.5%	(3) 7.5%	(40) 100.0%
Research scholar	(8) 61.5%	(3) 23.1%	(2) 15.4%	(0) 0.0%	(13) 100.0%
Total	(103) 43.8%	(69) 29.4%	(53) 22.6%	(9) 3.8%	(235) 100.0%

Table 4.11 presents the utilization of various apps for studies among different types of graduate programs. Across undergraduate (UG), postgraduate (PG), and research scholar categories, Google/Chrome emerges as the most utilized app, with percentages ranging from 39.6% to 61.5%. YouTube follows as the second most commonly used app, with usage percentages varying from 22.5% to 31.3%. Chat GPT and LinkedIn are also utilized, albeit to a lesser extent, with usage rates ranging from 12.5% to 25.3%. Overall, the data underscores the diversity in app usage among different graduate programs, with Google/Chrome being the most prevalent choice across all categories.

4.22 Uses of E-Payment app in various kind of SIM cards

Table: 4.12

SIM cards	Yes	No	Total
Airtel	(50) 56.8%	(38) 43.2%	(88) 100.0%
Vi	(16) 64.0%	(9) 36.0%	(25) 100.0%
Jio	(69) 65.1%	(37) 34.9%	(106) 100.0%
BSNL	(11) 68.8%	(5) 31.3%	(16) 100.0%
Total	(146) 62.1%	(89) 37.9%	(235) 100.0%

Table 4.12 provides insights into the utilization of e-payment apps across various SIM card providers. The data indicates that a majority of respondents from each provider utilize e-payment apps, with percentages ranging from 56.8% for Airtel to 68.8% for BSNL. Conversely, the percentage of respondents who reported not using e-payment apps ranged from 31.3% for BSNL to 43.2% for Airtel. Overall, the findings suggest a widespread adoption of e-payment apps among users of different SIM card providers, highlighting the importance of digital payment solutions in today's technological landscape.

4.23 Test: 1

A Chi-square test of independence was conducted to examine the association between gender and the SIM card currently being used by college students. The analysis revealed no significant association between college student's streams and their SIM Card usage, χ^2 (3, N=235) =1.132, p = 0.769. The p-value obtained was significant at the α = 0.05 level, indicating that the distribution of SIM card usage does not differs significantly across different streams.

4.24 Test: 2

According to the results of the Chi-square test of independence, there was no significant association found between Tiruchirappalli college students' streams and the SIM card currently being used, χ^2(18, N = 235) = 20.352, p = 0.313. The p-value obtained was significant at the α = 0.05 level, indicating that the distribution of SIM card usage not differs significantly across different streams among college students.

4.25 Test: 3

The results of the chi-square test of independence assessing the association between graduate programs and primary data usage among college students were not statistically significant, χ^2 (6, N = 235) =

11.881, p = 0.065. This suggests that there is no significant difference in primary data usage across various graduate programs.

4.26 Test: 4

The results of the Chi-square test of independence conducted to examine the association between types of data usage and the kind of study material downloaded revealed a significant association, $\chi^2(12, N = 235) = 9.970$, p = 0.619. The obtained p-value of 0.619 was not significant at the $\alpha = 0.05$ level, indicating that there is no significant association between types of data usage and the kind of study material downloaded. This suggests that the distribution of study material downloaded does not differ significantly across different types of data usage.

4.27 Test: 5

The results of the Chi-square test of independence conducted to examine the association between the highest network speed used and downloading study material with a high-speed network revealed a significant association, χ^2 (3, N = 235) = 8.472, p = 0.037. The obtained p-value of 0.037 was significant at the $\alpha = 0.05$ level, indicating that the propensity to download study material with a high-speed network differs significantly across different highest network speeds used

4.28 Test: 6

There is a significant difference in the performance of different SIM card providers across various metrics. BSNL is the top performer in signal strength, followed by Jio at 3.79. Jio leads in call quality with a mean score of 4.10, followed by Airtel at 4.05. Data connection and speed are consistent with a mean score of 3.57. However, customer care disparities are evident, with BSNL lagging behind with a mean score of 2.94, and Airtel holding the highest mean score at 3.35. These findings emphasize the importance of considering multiple factors when selecting a service provider for optimal user experience.

Kolmogorov-Smirnov Test

The normality of the data for each factor was assessed by using Kolmogorov-Smirnov test. For all factors (Signal strength, Call quality, Data connection and speed, Network speed, Network speed in college, Services, Security, Transaction speed, SMS, Customer Care), significant departures from normality were observed maximum are

(p < 0.05) and few are not (p < 0.05). Considering the Lilliefors Significance Correction, which adjusts for multiple comparisons, these results suggest that the assumption of normality is violated for the variables under investigation. Therefore, we proceeded to compute the non-parametric Kruskal-Wallis test to examine whether there are significant differences in satisfaction levels across various types of SIM card users.

Independent-Samples Kruskal-Wallis Test

A series of independent-samples Kruskal-Wallis test were conducted to examine the distribution of various performance metrics across categories of SIM card. The results indicated that for all performance metrics (i.e., Signal strength, Call quality, Data connection and speed, Network speed in college, Service of SIM company, Security, Transaction speed, SMS Send and Receive, and Customer care), the distributions were similar across categories of SIM card, all p > 0.05. Specifically, for Signal strength (H = 1.916, 3, p = 0.590), Call quality (H = 3.226, 3, p =0.358), Data connection and speed (H = .276, 3, p = 0.964), Network speed in college (H = 4.063, 3, p = 0.255), Service of SIM company (H = 1.478,3, p = 0.687), Security (H = 2.552, 3, p = 0.466), Transaction speed (H = 0.129, 3, p = 0.988), SMS Send and Receive (H = 0.704, 3, p = 0.872), and Customer care (H = 1.825, 3, p = 0.610), the null hypothesis was retained, suggesting no significant differences in distribution across SIM card categories. Given a significance level of 0.050, all tests utilized asymptotic significance. Therefore, it can be concluded that the distributions of performance metrics do not vary significantly across different categories of SIM card.

4.29 Test: 7

The mean and standard deviation of user satisfaction ratings for various mobile services across different SIM card providers. For instance, while Airtel users generally reported high satisfaction ratings for services like Watching Videos on YouTube (Mean = 3.94, SD = 0.862) and social media (Mean = 3.87, SD = 0.992), Vi users tended to have lower satisfaction ratings for similar services, such as Watching Videos on YouTube (Mean = 3.40, SD = 0.957) and social media (Mean = 3.68, SD = 1.069). Moreover, when comparing across all services, BSNL users consistently reported higher standard deviations, indicating more variability in their satisfaction ratings compared to users of other

providers. This suggests that while some services may perform consistently well across different providers, others may elicit more diverse responses, potentially indicating areas for improvement or optimization.

Kolmogorov-Smirnov Test

The normality assumptions for the dependent variables across different SIM cards were assessed using the Kolmogorov-Smirnov test. For TV on mobile, all SIM cards violated the assumption of normality based on test, with significant Kolmogorov- Smirnov statistics ($p < 0.05$). Similarly, for Search Engine of Google, Watching Videos on YouTube, Social media, and downloading the movie, normality assumptions were violated across all SIM cards, as indicated by significant Kolmogorov-Smirnov ($p < 0.05$). These results suggest that the distribution of data for these variables deviates from normality, potentially influencing the choice of appropriate statistical analyses or requiring caution when interpreting parametric test results. Therefore, we proceeded to compute the non-parametric Kruskal-Wallis test to examine whether there are significant difference in sim and TV on mobile, search engine of Google, watching videos in YouTube, social media and downloading the movie.

Independent-Samples Kruskal-Wallis Test

The results of the independent-samples Kruskal-Wallis tests indicated that, for Video call ($H = 3.236$, 3, $p = 0.357$), TV on mobile ($H = 0.367$, 3, $p = 0.947$), Search Engine of Google ($H = 2.957$, 3, $p = 0.398$), Social media ($H = 1.330$, 3, $p = 0.722$), and Downloading the movie ($H = 1.384$, 3, $p = 0.709$), there were no statistically significant differences in the distributions across categories of SIM card at the $\alpha = 0.050$ level. Therefore, the null hypothesis was retained for all variables. The significance level was set at 0.050, and asymptotic significance was displayed.

4.30 Test: 8

A Chi-square test of independence was conducted to examine the association between types of graduate programs and device frequently used for internet access among the college students, χ^2 (6, N=235) =13.267, $p = 0.039$. The p-value obtained was significant at the $\alpha = 0.05$ level, indicating that the types of graduates' usage differ significantly across device frequently used for internet access.

V. FINDINGS

- ✓ The majority of respondents were female (51.1%) and primarily aged between 20–24 years (58.3%), with 77.45% pursuing undergraduate studies, indicating a higher participation from young female undergraduates.

- ✓ 40.85% of the respondents come from the Arts and Science streams, 18.30% of Engineering, 10.21% of medicine, 5.96% of Agriculture, 8.09% of Law, 6.81% of Diploma, and 9.79% of Management. The respondents were mostly from the arts and science streams.

- ✓ Jio SIM cards are the most preferred among college students, followed by Airtel and Vi. A majority of the respondents use post-paid connections, with 60% of females and over 40% of males opting for them. Most students (75.74%) use single SIM cards, while dual SIM usage (24.25%) is more common among management students. Airtel holds the highest user share (8.5%), whereas BSNL, despite offering the lowest call rates (1.3%), has limited preference. In terms of quality, Airtel (59.1%) and Jio (53.8%) are rated "Good" by most users, while Vi and BSNL SIM cards show a balanced mix of "Good" and "Average" ratings, with BSNL having no "Bad" ratings.

- ✓ Call drops remain a common issue across all telecom providers, ranging from 6.8% to 12.5%, with Vi and BSNL users particularly affected by poor reception at 12.0% and 6.3%, respectively. Data connectivity problems are more widespread, impacting 32.0% to 56.3% of respondents, while server-related issues are less frequent, reported by 6.3% to 22.7%. Despite some users reporting no significant problems, the data underscores the need for service improvements. In terms of user loyalty, Airtel and BSNL have the highest usage durations, with some users remaining for over 12 years, whereas Vi and Jio have shorter usage spans. Across all providers, there is a strong preference for 28-day recharge packs—Airtel (62.5%), Vi (64.0%), Jio (57.5%), and BSNL (68.8%)—indicating a trend toward flexible, short-duration plans.

- ✓ 51.91% of respondents use SIM cards for entertainment, 33.62% for education, 7.66% for online gaming, and 6.81% for online shopping.

- The respondents, both male and female, favor recharge plans ranging from Rs. 200 to Rs. 500, with over 30 female respondents spending more than male respondents.
- Customer care usage varies among telecom providers, with rates ranging from 29.5% (Airtel) to 40% (Vi). A larger proportion, 60% to 70.5%, do not use customer care services.
- The network users vary among telecom providers, with Airtel and Jio having users on all network types. Most users use 4G networks, with 85.2% of Airtel users and 67.9% of Jio users on 4G networks. Jio has a significant portion of 5G networks (30.2%). BSNL users predominantly use 3G networks (93.8%), while Vi users exclusively use 4G networks. Overall, 4G networks are the most commonly used technology among respondents.
- 72% of respondents, primarily 53.5% male students, use mobile applications related to their SIM brand, while 28% do not use such applications.
- From the study, it was found that "My Jio" is the most popular mobile service app, with 33.2% of users choosing it. "Airtel Thanks" is also popular, with 27.7% using it. "Nil" is less popular, with 27.7% using it.
- The majority of respondents, 61.7%, use the "Hotspot" feature for network connectivity, with 28.1% not using any network connection method. Modern and Ethernet methods are less commonly used, indicating a preference for hotspot functionality.
- The majority of users (31.5%) and (32.2%) spend 1 hour or 2 hours on academic activities using mobile devices, with a smaller proportion (13.2%) and fewer users (4 to 5 hours) dedicating longer durations.
- Google/Chrome is the most utilized application among graduate program participants, with usage percentages ranging from 39.6% to 61.5% across undergraduate (UG), postgraduate (PG), and research scholar categories. YouTube emerges as the second most commonly used application, with usage percentages varying from 22.5% to 31.3% across the mentioned categories. ChatGPT and LinkedIn follow with lower but notable usage rates among participants.
- Airtel users primarily use notes (59.1%), followed by videos (22.7%), Vi users (56.0%) prefer notes, Jio users (58.5%) favor notes but prefer videos (22.6%), and BSNL users (43.8%) and videos (25.0%) in equal proportions. Notes are the most utilized study material across all providers, indicating their importance in academic endeavors among SIM card users.
- The e-payment apps are widely adopted by users of different SIM card providers, with BSNL having the highest utilization rate at 68.8%, followed by Jio at 65.1%. Airtel users have the lowest adoption rate at 56.8%. However, the percentage of respondents not using e-payment apps varied across providers, indicating some variation in adoption. The data highlights the growing importance of digital payment solutions in modern technology usage patterns.
- The analysis indicates that there is no significant association between college students' gender and their SIM card usage, nor between students' academic streams and their current SIM card usage, though usage patterns vary across different streams. Similarly, no significant relationship was found between graduate programs and primary data usage among students. Additionally, the type of data usage does not significantly influence the volume or frequency of study material downloaded, suggesting a consistent pattern of academic data consumption regardless of usage type.The maximum network speed and the chance of downloading study materials over a high- speed network were found to be significantly correlated in the study.
- There is no significant difference or variation in distributions across SIM card categories among performance metrics (signal strength, call quality, data connectivity and speed, network speed in colleges, services, security, transaction speed, SMS, and customer care).
- Normality tests using Kolmogorov-Smirnov test indicated significant departures from normality for all factors except a few. The assumption of normality was violated. Consequently, non-parametric Kruskal-Wallis tests were conducted to assess satisfaction levels among different types of SIM card users.
- Kruskal-Wallis test showed no significant differences in performance metric distributions

across SIM card categories (p > 0.05 for all metrics). This suggests that signal strength, call quality, data connection and speed, network speed in college, service of the SIM company, security, transaction speed, SMS send and receive, and customer care are similarly distributed across different SIM card categories.

✓ The user satisfaction ratings for different mobile services across various SIM card providers. Airtel users reported higher satisfaction for services like watching videos on YouTube and social media, while Vi users tended to be less satisfied. BSNL users showed more variability in satisfaction ratings across all services, suggesting differing performance levels and potential areas for improvement.

✓ Normality assumptions were violated across all SIM cards for dependent variables such as TV on mobile, the search engine of Google, watching videos on YouTube, social media, and downloading the movie, as indicated by significant Kolmogorov-Smirnov statistics ($p < 0.05$). These findings suggest that the data distribution deviates from normality, impacting the choice of statistical analyses and the interpretation of non-parametric test results. Consequently, non-parametric Kruskal-Wallis tests were conducted to explore significant differences in SIM usage and various media consumption activities.

✓ The independent-sample Kruskal-Wallis test showed no significant differences in distributions across categories of SIM cards for video calls, TV on mobile, Google Search Engine, social media, and downloading movies at the $\alpha = 0.050$ level, retaining the null hypothesis for all variables.

✓ There is a significant association between types of graduates and the device used by the college students of Southern Tamil Nadu, India.

VI. CONCLUSION, SUGGESTIONS & RECOMMENDATIONS

6.1 Conclusion

The study on telecommunication network usage among college students highlights key trends and preferences. A majority of respondents were female and belonged to the 20–24 age group, with undergraduates—especially from Arts and Science streams—forming the largest user base. Jio emerged as the most preferred SIM card, followed by Airtel and Vi. Pre-paid and single SIM usage was more prevalent, reflecting a trend toward flexible and cost-effective options. In terms of service quality, Airtel and Jio were rated higher, though issues such as call drops, poor reception, and data connectivity remain significant across providers. The use of e-payment apps was widespread, with BSNL users showing the highest utilization. These findings suggest a dynamic and evolving telecom landscape, underscoring the need for service improvement and student-centric solutions.

6.2 Suggestions

- Improve network quality and reduce call drops to enhance user satisfaction.
- Develop user-friendly mobile apps to support varied customer needs.
- Offer flexible recharge plans, especially short-term options like 28-day packs, to match student preferences.
- Strengthen customer care services to provide timely and effective support.
- Collaborate with educational institutions to provide customized student packages.
- Ensure equitable network access across regions and eliminate service disparities.
- Regularly upgrade technology and increase awareness among users regarding available services.

6.3 Recommendations

➢ Implement continuous feedback systems to monitor user satisfaction and identify areas for improvement.
➢ Invest in network infrastructure, particularly in student-dense areas, to enhance connectivity and reliability.
➢ Introduce student-focused incentives or loyalty programs to encourage long-term use.
➢ Partner with colleges to provide exclusive offers and promote telecom services tailored to students.
➢ Stay responsive to evolving trends and advancements in mobile technology to remain competitive.

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