

Digital Engagement Among Adolescents: A Study of Internet Usage Patterns and Gender Disparities

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Abstract: The proliferation of digital technologies has reshaped adolescents' learning ecologies, positioning digital engagement as a critical dimension of educational participation and equity. This study examines internet usage patterns among senior secondary school adolescents, with particular attention to gender-based disparities in digital engagement. Employing a quantitative descriptive survey design, data were collected from a sample of 304 students enrolled in government and private secondary schools. Internet usage was assessed using the Internet Usage Scale developed by Saini and Kaur (2017). Data analysis involved descriptive statistics (mean and standard deviation) to determine overall engagement levels and independent samples *t*-tests to examine gender differences. Results indicated moderate to high levels of digital engagement among adolescents, underscoring the pervasive integration of internet-based resources into academic, communicative and recreational domains. However, statistically significant gender differences emerged in patterns and intensity of usage, suggesting that digital engagement is not uniformly experienced. The findings point toward the persistence of gendered digital practices shaped by broader socio-cultural and institutional contexts. By moving beyond access-based conceptions of the digital divide, this study highlighted qualitative differences in participation that carry implications for educational equity. The results further contribute to ongoing debates on digital inclusion by foregrounding gender as a critical determinant of adolescent digital engagement. Implications are discussed for policy and practice aimed at fostering equitable and meaningful digital participation in secondary education.

Keywords: Digital Engagement; Adolescents; Gender Disparities; Digital Divide; Educational Equity.

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I. INTRODUCTION

The rapid proliferation of digital technologies has fundamentally transformed the educational experiences of adolescents worldwide. Internet connectivity is no longer peripheral to schooling; rather, it constitutes a central mechanism through which students access information, collaborate and construct knowledge. Consequently, digital engagement has emerged as a critical construct in contemporary educational discourse, extending beyond mere access to encompass patterns, intensity and purposes of technology use. Understanding how adolescents engage with digital environments is therefore essential for advancing educational equity and inclusion.

While global expansion of internet infrastructure has improved access across regions, disparities in digital

participation persist. The concept of the digital divide has evolved from a focus on access-based inequalities to a more nuanced understanding that emphasizes differences in usage, competencies and outcomes. In educational contexts, these disparities may influence learning opportunities, academic performance and social development. Among the various determinants of digital engagement, gender remains a significant and debated factor. Although narrowing gaps in basic access have been reported, research suggests that gendered patterns of internet use continue to shape the ways adolescents interact with digital technologies. Existing studies have documented variations in the frequency and purposes of internet use among adolescents; however, findings remain context-specific and sometimes inconsistent. Moreover, many investigations emphasize access rather than examining differentiated patterns of engagement. There remains a need for empirical evidence that systematically explores gender-

based differences in digital engagement within secondary education settings.

Against this backdrop, the present study examines internet usage patterns among senior secondary school adolescents, with particular emphasis on gender disparities. By situating digital engagement within broader discussions of equity and participation, the study seeks to contribute empirical insights into the determinants of adolescent digital behaviour and inform policies aimed at fostering inclusive and meaningful digital learning environments.

II. LITERATURE REVIEW

Research on adolescent digital engagement has increasingly moved beyond access-based explanations of the digital divide toward examining qualitative differences in patterns of use. van Dijk (2020) argues that contemporary digital inequalities are rooted not only in physical access but also in skills, usage diversity, and outcomes, emphasizing the multidimensional nature of digital participation. Extending this perspective, Hargittai (2010) found that socio-demographic factors, including gender, significantly influence online skills and patterns of engagement among young users, thereby reinforcing stratified digital experiences. Similarly, Livingstone and Helsper (2007) demonstrated that inequalities in internet use among adolescents are shaped by social and cultural contexts, with variations observed in educational versus recreational usage. Focusing specifically on gender, Cooper (2006) reported persistent gender differences in both frequency and purpose of internet use, suggesting that male and female adolescents often engage differently with digital platforms. In a large-scale international assessment, OECD (2019) highlighted that while access gaps between boys and girls have narrowed, disparities remain in advanced digital skills and usage orientation, which may influence academic outcomes. More recently, Scherer and Siddiq (2019) found that gender differences in digital competence and engagement patterns continue to exist across educational systems, underscoring the need for context-specific empirical investigations. Collectively, these studies suggest that digital engagement among adolescents is shaped by structural, social, and gender-related determinants, thereby providing a strong conceptual foundation for examining internet usage patterns and gender disparities at the secondary school level.

➤ *Significance of the Study*

The present study contributes to the growing body of research on digital engagement by providing empirical evidence on the level and gender-based patterns of internet usage among senior secondary school adolescents. As digital technologies increasingly shape educational access, communication, and learning practices, understanding how adolescents engage with the internet is essential for promoting equitable participation in digital environments. By examining gender differences in internet usage, the study moves beyond access-oriented perspectives and highlights differentiated patterns of digital engagement that may influence academic and social outcomes. The findings offer valuable insights for educators, school administrators, and

policymakers in designing targeted interventions, digital literacy programs, and inclusive technology policies that foster balanced and meaningful digital participation among adolescents. Furthermore, the study contributes context-specific evidence to broader discussions on digital equity within secondary education.

➤ *Objectives of the Study*

- To examine the level of digital engagement (internet usage) among senior secondary school adolescents.
- To analyse gender differences in internet usage patterns among senior secondary school adolescents.

➤ *Hypothesis of the Study*

- **H₀:** There is no significant gender difference in digital engagement among senior secondary school adolescents.

III. DELIMITATION OF THE STUDY

- The study was delimited to only one district of Himachal Pradesh.
- The present study was confined to schools affiliated with the Himachal Pradesh Board of School Education Dharamshala (HPBOSE) and Central Board of Secondary Education New Delhi (CBSE).
- The present study was delimited to the students of 11th, 12th grades only.

IV. METHODOLOGY

➤ *Research Design*

The study employed a quantitative descriptive survey design to examine the level of digital engagement and analyse gender differences in internet usage among senior secondary school adolescents. This design was appropriate for systematically assessing existing usage patterns without manipulation of variables.

➤ *Participants (Sample)*

The sample of the present study consisted of 304 senior secondary school students selected from government and private schools. The participants included both male and female adolescents to enable gender-based comparison. A probability-based sampling technique was used to ensure adequate representation.

➤ *Tool Used*

Data were collected using the Internet Usage Scale developed by Saini and Kaur (2017), which measures frequency, purpose and intensity of internet use across academic and non-academic contexts using a Likert-type format.

➤ *Reliability and Validity*

The scale demonstrates satisfactory psychometric properties. The original authors reported acceptable internal consistency, with Cronbach's alpha above 0.70. Content validity was established through expert evaluation, and construct validity was supported through appropriate validation procedures. Reliability was re-examined for the present sample to ensure consistency.

➤ *Data Analysis*

Descriptive statistics (Mean and Standard Deviation) were computed to assess the overall level of digital engagement. An independent samples t-test was conducted to examine gender differences in internet usage. Statistical significance was determined at the 0.05 level.

V. DATA ANALYSIS AND INTERPRETATION

This section presents the statistical analysis of data collected to examine the level of digital engagement and gender differences in internet usage among senior secondary

school adolescents. Descriptive statistics (Mean and Standard Deviation) were used to assess overall internet usage and an independent samples t-test was applied to determine significant gender differences. The findings are presented in line with the objectives of the study.

➤ *Level of Digital Engagement (Internet Usage) Among Senior Secondary School Adolescents.*

For deciding the various levels of internet usage, frequency of senior secondary school students was calculated as per score range given in the table 1. below:

Table-1 Level of Digital Engagement (Internet Usage) Among Senior Secondary School Adolescents

Sr. No.	Range of Raw Score	Range of z Score	Frequency	Percentage	Grade	Level of Internet Usage
1	74 and Above	+2.59 & above	2	0.66%	A	Extremely High Usage
2	65 to 73	+1.89 to +2.59	12	3.95%	B	High Usage
3	55 to 64	+1.10 to +1.89	28	9.21%	C	Above Average Usage
4	41 to 54	-0.01 to +1.10	103	33.88%	D	Average/Moderate Usage
5	31 to 40	-0.79 to -0.01	87	28.62%	E	Below Average Usage
6	21 to 30	-0.79 to below	72	23.68%	F	Low Usage
	Total		304	100%		

The table 1 showed that two students i.e. 0.66% scored in the range of 74 and above are categorized as ‘extremely high level of internet usage’ and the fall under the grade ‘A’ where as twelve students i.e. 3.95% scored in the range of 65 to 73 are categorized as ‘high level of internet usage’ and fall under the grade ‘B’, twenty eight students i.e. 9.21% scored in the range of 55 to 64 are categorized as ‘above average level of internet usage’ and fall under the grade ‘C’. it is also cleared that the one hundred three students i.e. 33.88% scored between the 41 to 54 and are categorized as ‘average/moderate level of internet usage’ and fall under the grade ‘D’, eighty-seven students i.e. 28.62% scored in the range of 31 to 40 are categorized as ‘below average level of internet usage’ and fall under the grade ‘E’, only seventy-two students i.e. 23.68% scored in the range of 21 to 30 are categorized as ‘low level of internet usage’ and fall under the grade ‘F’ respectively.

Additionally, the level of internet usage among senior secondary school students is shown in the figure 1.

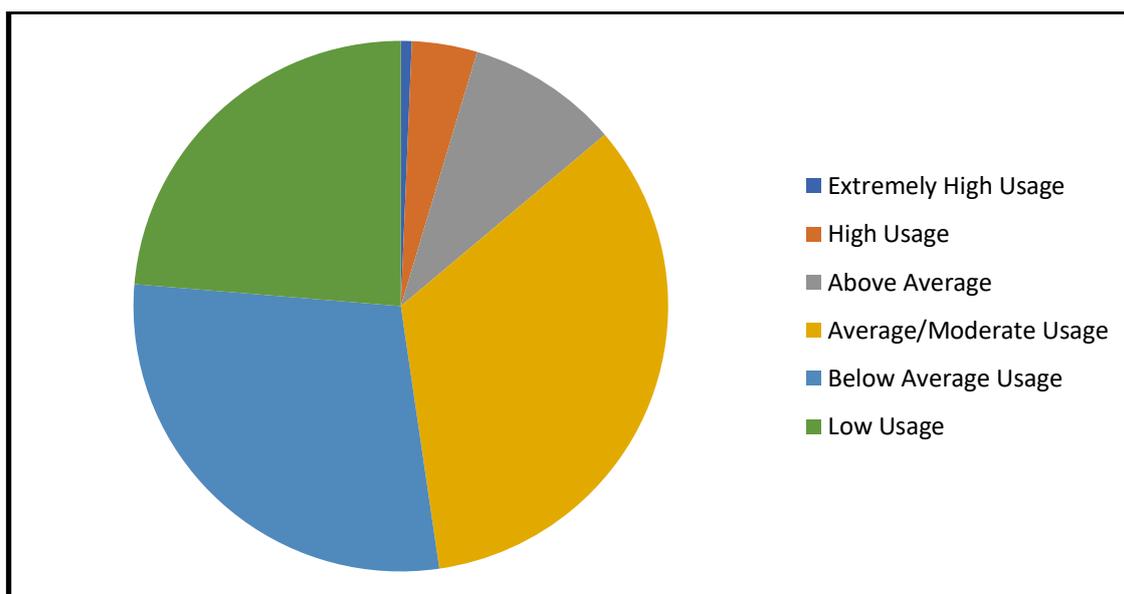


Fig: 1. Level of Internet Usage among Senior Secondary School Students.

Figure 1 depicted in the pie chart, reveals that the majority fall within moderate to low usage categories. Students with ‘Average or Moderate Level of Internet Usage’

are the most prominent and are placed in *Grade D*, followed by those in the ‘*Below Average*’ and ‘*Low*’ categories, corresponding to *Grades E and F* respectively. A smaller

portion of students exhibit 'Above Average' and 'High' levels of usage, aligned with *Grades C and B*, while only a very limited number demonstrate 'Extremely High Internet Usage', earning *Grade A*. This distribution indicates that excessive internet use is rare, and most students engage with the internet at average/moderate level.

➤ *Gender Differences in Internet Usage Patterns Among Senior Secondary School Adolescents*

In order to find out the significance difference on Internet Usage among male and female of Senior Secondary school students, t-value was computed and shown in Table 2.

Table- 2 Mean, Standard Deviation and 't' Value for Female and Male Senior Secondary School Students on Internet Usage:

Sr. No.	Gender	Number	Mean	Standard Deviation	Degree of freedom(df)	't' value
1	Female	152	41.72	13.287	302	2.229 *
2	Male	152	45.13	13.365		

Note: * indicates that the calculated t-value is significant at acceptable level of significance.

Table value of 't' for df 302 at 0.05 level of significance is 1.97.

Table 2 showed that the calculated 't' value of 2.229 come to be highly significant at 0.005 level of significance for the two groups of male and female senior secondary school students. Males exhibit a higher mean internet usage score compared to their counterparts. Hence, it is interpreted that male and female senior secondary school students differ significantly to their internet usage. Since, the calculated 't' value of groups reached up to acceptable level of significance on their internet usage.

Since the calculated 't' value representing the significance of the difference is turned out to be 2.229, which is significant at 0.05 level of significance. Hence hypothesis stated "There is no significant gender difference in digital engagement among senior secondary school adolescents." is rejected.

Additionally, the Comparison of Internet Usage among Senior Secondary School Students in Relation to Their Gender is shown in the figure 2:

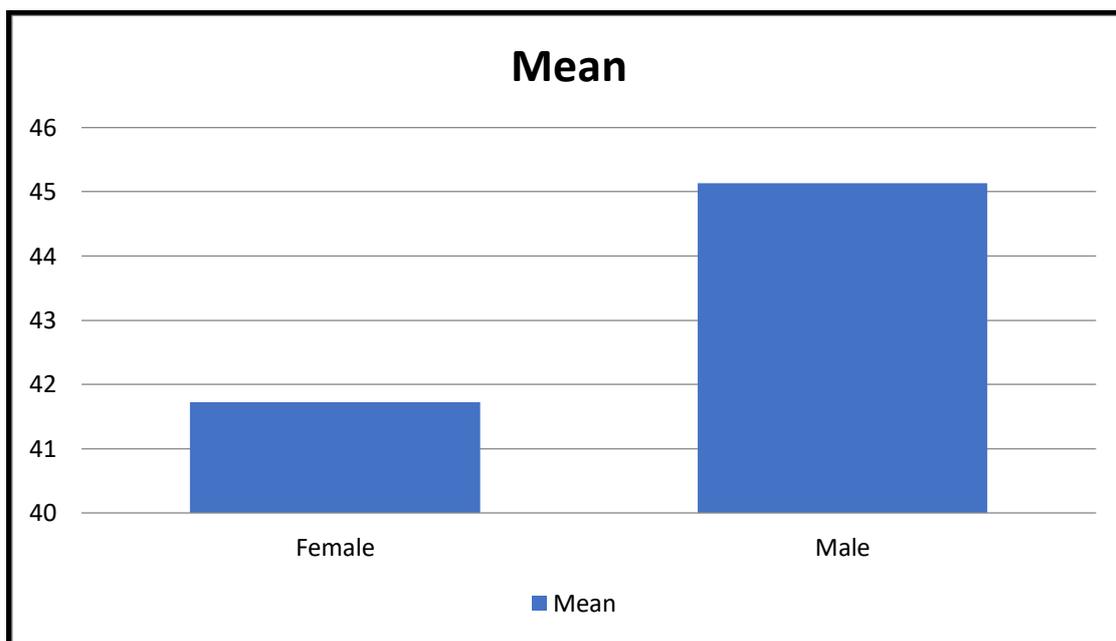


Fig: 2 Comparison of Internet Usage among Senior Secondary School Students in Relation to Their Gender.

Figure 2 depicted in the bar chart, highlights a clear difference in the mean scores based on gender. *Male students* demonstrate a *higher mean level of internet usage* compared to *female students*, indicating that, on average, males engage more actively with the internet. This difference suggests that gender plays a significant role in shaping internet usage patterns among students.

VI. CONCLUSION

The present study examined the level of digital engagement among senior secondary school adolescents and explored gender differences in internet usage patterns. The findings revealed that the majority of students fall within the average to below-average categories of internet usage, indicating moderate levels of digital engagement. Only a small proportion of students demonstrated extremely high levels of usage, suggesting that excessive internet use is not widespread within the sampled population. Further analysis

revealed a statistically significant gender difference in internet usage patterns, with male students reporting higher mean scores than female students. This indicates that gender remains an important determinant of digital engagement among adolescents. The results highlight that digital participation is not uniform and may be influenced by socio-cultural and contextual factors. Overall, the study underscores the need to view digital engagement not merely in terms of access, but in terms of differentiated patterns of use.

VII. RECOMMENDATIONS

- Schools should design structured digital literacy programs to promote balanced and productive internet usage among adolescents.
- Special attention should be given to addressing gender-based differences by encouraging equitable digital participation and access to technology-related opportunities.
- Teachers should integrate guided academic use of internet resources into classroom practices to enhance constructive digital engagement.
- Parents should be sensitized regarding monitoring and supporting healthy internet habits among adolescents.
- Policymakers should develop inclusive digital education strategies that ensure equal opportunities for both male and female students.
- Future research may explore additional demographic and psychosocial variables influencing digital engagement to gain deeper insights into adolescent internet usage patterns.

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