The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 4 | Issue 7 | July 2026
ISSN: 2583-973X (Online), SJIF IF(2026): 5.6
Website: www.theacademic.in

Internet Usage among Trainee Teachers in Relation to Socio-Economic Status, Gender, and Academic Achievement Level

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DOI : https://doi.org/10.5281/zenodo.22082431

ARTICLE DETAILS

Research Paper
Received: 24-06-2026
Accepted: 19-07-2026
Published: 20-08-2026

Keywords:
internet usage, trainee teachers, socio-economic status, gender, academic achievement, digital divide, teacher education, Technology Acceptance Model

ABSTRACT

The rapid integration of the internet into educational practices has significantly influenced teaching and learning processes, particularly within teacher education programmes. Grounded in Digital Divide Theory (van Dijk, 2005) and the Technology Acceptance Model (TAM; Davis, 1989), the present study examines internet usage patterns among trainee teachers in relation to socio-economic status (SES), gender, and academic achievement level. A descriptive survey design was adopted, and data were collected from a randomly selected sample of 200 trainee teachers (n = 118 female, 59%; n = 82 male, 41%) enrolled in Bachelor of Education (B.Ed.) programmes across six colleges of education in Jammu district during the academic session 2024–2025. A validated 27-item self-developed questionnaire (Cronbach's α = .82) was employed as the data collection instrument. Results indicated universal internet usage (100%), with mobile phones as the predominant access device (79.0%) and home as the preferred location (67.5%). Trainee teachers extensively used the internet for exam preparation (94.0%), concept learning (94.5%), and project completion (93.0%). Inferential analysis using an independent-samples t-test and one-way ANOVA revealed no

statistically significant differences in internet usage with respect to gender ($t(198) = -0.98$, $p = .328$, $d = 0.14$), socio-economic status ($F(2, 197) = 1.23$, $p = .295$, $\eta^2 = .01$), or academic achievement level ($F(2, 197) = 2.55$, $p = .081$, $\eta^2 = .03$). These findings suggest that internet usage has become relatively equitable across demographic and academic categories in contemporary Indian teacher education contexts, possibly attributable to the proliferation of affordable mobile data services. Implications for mobile-optimised learning platforms, structured digital competency training, and second-level digital divide research are discussed.

INTRODUCTION

The rapid advancement of Information and Communication Technologies (ICTs) has significantly transformed contemporary educational practices across the globe. Among these technologies, the internet has emerged as a powerful educational resource offering unprecedented access to information, communication, and learning opportunities. In teacher education, the internet plays a critical role in supporting academic learning, pedagogical preparation, professional development, and self-directed learning among trainee teachers.

Teacher education programmes are expected to prepare future teachers who are not only subject-competent but also digitally literate and capable of integrating technology meaningfully into classroom instruction. Accordingly, trainee teachers increasingly rely on the internet for lesson plans, teaching aids, projects, seminars, and conceptual understanding. Despite widespread availability, the nature and extent of educational internet use may vary considerably among trainee teachers based on individual, contextual, and structural factors.

Digital Divide Theory (van Dijk, 2005) suggests that inequalities in technology access and usage manifest across multiple dimensions—physical access, skills, and meaningful usage—with socio-economic status playing a pivotal role. The Technology Acceptance Model (TAM) posits that actual system use is influenced by perceived usefulness and perceived ease of use, which may vary by individual characteristics including gender and prior achievement (Davis, 1989). These theoretical perspectives suggest that socio-economic background, gender, and academic achievement may differentially influence trainee teachers' access to digital resources, frequency of use, and purposes of engagement with the internet.

In the Indian context, the rapid expansion of affordable mobile internet services—particularly following the introduction of low-cost 4G data plans—may have substantially altered traditional patterns of the digital divide, necessitating fresh empirical examination. While prior research has documented significant access barriers and SES-related disparities (Warschauer, 2003; Magwa, 2013), more recent evidence suggests that mobile technology may be functioning as an equalising agent in developing contexts (Chakraborty & Bosman, 2020). The present study seeks to address this empirical gap by examining internet usage patterns among trainee teachers in Jammu district, guided by Digital Divide Theory and TAM.

REVIEW OF RELATED LITERATURE

Internet Use in Education and Teacher Preparation

The internet functions as a powerful educational resource, enhancing access to information, supporting self-directed learning, and facilitating communication and collaboration. Empirical studies demonstrate that internet use enriches learning experiences by providing diverse instructional materials, online lectures, and digital repositories (Means et al., 2009; Azizan, 2010). Research documents that trainee teachers rely on the internet for lesson plans, teaching aids, seminars, projects, and self-study (Bani, 2005; Sasikala, 2012). However, the educational benefits of internet access are contingent upon learners' digital competence and the pedagogical orientation of teacher education programmes (Krumsvik, 2014). Without structured guidance, internet use may remain superficial and fail to translate into enhanced pedagogical preparation.

ICT Integration in Teacher Education

Substantial research has examined ICT integration in teacher education. Angeli (2005) demonstrated that structured technology-infused instruction enhances pre-service teachers' technology competence when paired with appropriate pedagogical strategies. Similarly, Goktas et al. (2009) found generally positive perceptions towards ICT integration among teacher educators and trainees, though barriers such as insufficient training, inadequate resources, and poor institutional planning persist. Studies across diverse contexts highlight gaps between technology access and effective pedagogical use (Tondeur et al., 2017), underscoring the continuing need for empirical studies on actual internet use for educational purposes rather than mere access or attitudinal measures.

Internet Usage and Gender

Gender differences in internet and technology usage yield mixed findings in the extant literature. Some studies indicate that males exhibit greater confidence and frequency in technology use (Colley & Maltby,

2008), while others find minimal or diminishing differences, particularly among educated populations (Lai & Gwung, 2013). In teacher education contexts, Bani (2005) reported no significant gender differences in internet knowledge among trainees. More recent evidence suggests comparable academic internet usage between genders, though preferences in the types of online activities differ by gender (Kimbrough et al., 2013). Hargittai and Shafer (2006) argued that while online skill differences between genders are narrowing, perceived skill differences persist, with implications for technology adoption and usage.

Socio-Economic Status and Digital Access

Socio-economic status (SES) significantly influences digital technology access and internet usage patterns. Higher SES learners typically enjoy better device access, reliable connectivity, and supportive home environments, enabling more effective educational internet use (van Deursen & van Dijk, 2014). A persistent digital divide exists even amid expanding access, particularly in developing nations (Magwa, 2013). Van Dijk's (2005) multi-level model highlights that even when material access barriers are reduced, SES-related inequalities in usage sophistication—second-level divides—may endure. In developing contexts such as India, analysing internet usage by SES remains vital to understanding whether expanding mobile connectivity is translating into substantively equitable educational engagement.

Academic Achievement and Internet Use

The relationship between academic achievement and internet usage is complex and context-dependent. Higher-achieving students often use the internet strategically for research and learning, demonstrating more purposeful engagement with digital resources (Sunday Paul, 2013). Conversely, excessive or unstructured internet use may not enhance academic performance and may even impede it (Kuss et al., 2013; Kubey et al., 2001). In teacher education, this association merits investigation, as understanding how achievement-related differences in internet use manifest may inform curricular and instructional strategies to enhance both academic success and pedagogical competence.

Theoretical Framework

Digital Divide Theory

Digital Divide Theory (van Dijk, 2005; Warschauer, 2003) posits that inequalities in technology access and usage exist at multiple levels. Van Dijk's (2005) model identifies four successive stages: motivational access, material access, skills access, and usage access. This framework suggests that even when material access is achieved, significant inequalities may persist in how individuals use technology, shaped by socio-

economic resources, educational background, and social capital. The rapid expansion of affordable mobile internet in developing contexts like India may be reducing traditional first-level divides while second-level usage divides—characterised by differences in digital skill sophistication and usage quality—persist (Hargittai, 2002).

Technology Acceptance Model (TAM)

The Technology Acceptance Model (Davis, 1989; Venkatesh & Davis, 2000) proposes that actual system use is determined by behavioural intention, which is influenced by perceived usefulness and perceived ease of use. Applied to trainee teachers, TAM suggests that those who perceive the internet as useful for academic tasks and easy to navigate will demonstrate higher usage frequencies and more diverse educational applications. TAM also provides a framework for understanding potential gender differences in usage patterns (Venkatesh & Morris, 2000) and the relationship between academic achievement and strategic internet use (Tsai & Tsai, 2010).

Research Gap

The reviewed literature demonstrates that internet usage in teacher education is influenced by individual, socio-economic, and institutional factors. While substantial research has examined ICT attitudes and access, fewer studies have systematically investigated actual usage patterns in relation to multiple demographic and academic variables simultaneously, particularly in regional Indian contexts characterised by the rapid proliferation of mobile internet. The present study addresses this gap by providing a theoretically grounded, empirically rigorous examination of internet usage patterns among trainee teachers in Jammu district.

OBJECTIVES OF THE STUDY

Grounded in Digital Divide Theory and TAM, the present study was undertaken with the following objectives:

1. To examine the frequency, duration, devices used, preferred locations, educational purposes, and perceived usefulness of internet usage among trainee teachers in Jammu district.
2. To investigate whether there is a statistically significant difference in internet usage among trainee teachers with respect to their socio-economic status.
3. To examine whether there is a statistically significant difference in internet usage among trainee teachers with respect to their academic achievement level.

4. To determine whether there is a statistically significant difference in internet usage among trainee teachers with respect to gender.

NULL HYPOTHESES

The following null hypotheses were formulated for inferential testing:

H_{01}: There is no statistically significant difference in internet usage among trainee teachers with respect to their socio-economic status.

H_{02}: There is no statistically significant difference in internet usage among trainee teachers with respect to their academic achievement level.

H_{03}: There is no statistically significant difference in internet usage among trainee teachers with respect to gender.

METHOD

Research Design

A descriptive survey research design was adopted to examine internet usage patterns among trainee teachers and to analyse differences with respect to socio-economic status, gender, and academic achievement level. The cross-sectional survey method was considered appropriate as it enables systematic data collection from a representative sample and facilitates quantitative analysis of existing conditions without manipulation of variables (Creswell, 2014).

Population and Sample

The target population comprised all trainee teachers (N = 847) enrolled in Bachelor of Education (B.Ed.) programmes across six colleges of education in Jammu district during the academic session 2024–2025. A sample of 200 trainee teachers (n = 118 female, 59.0%; n = 82 male, 41.0%) was selected using simple random sampling, in which each trainee teacher was assigned a unique identification number and 200 numbers were selected using a random number generator without replacement. The sample size was determined a priori based on power analysis (power = .80, α = .05, medium effect size; Cohen, 1988) and was deemed adequate for detecting meaningful differences using t-test and one-way ANOVA procedures.

Operational Definitions

Internet Usage was operationalised as a composite score reflecting four dimensions: (a) frequency of access, (b) duration of use, (c) diversity of educational activities across nine categories, and (d) perceived utility for

academic work. Each of the 27 items was rated on a 5-point frequency scale (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always), with no reverse-scored items. Item scores were summed to yield a total score ranging from 27 to 135, with higher scores indicating greater internet usage for academic purposes. Socio-Economic Status (SES) was classified using Kuppuswamy's Socio-Economic Status Scale (updated 2024) into Low (scores 3–10), Middle (11–20), and High (21–29) categories. Academic Achievement was determined by aggregate percentage scores in the most recent qualifying examination and categorised as Low (< 60%), Average (60–75%), and High (> 75%).

Data Collection Instrument

Data were collected using a self-developed 27-item questionnaire covering internet access, frequency and duration of use, purposes, preferred devices, locations, and perceived usefulness. Responses to all items were recorded on a 5-point frequency scale ranging from 1 (Never) to 5 (Always), and item scores were summed to obtain a total internet usage score. Content validity was established through expert review (n = 5 faculty members with expertise in educational technology and research methodology) and systematic, literature-based item development. The internal consistency reliability of the instrument was satisfactory (Cronbach's $\alpha = .82$). The instrument was pilot-tested with a small independent sample (n = 25) and refined prior to the main data collection phase. Data were collected during October–November 2024. Of 215 questionnaires distributed, 200 usable responses were retained after screening for completeness and validity (response rate: 96.7%).

Statistical Analysis

Data were analysed using SPSS Version 14.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise internet usage patterns. Inferential analyses were conducted to address the three null hypotheses. Specifically, an independent-samples t-test was employed to examine gender differences in internet usage. Prior to testing, assumptions of normality (Shapiro-Wilk test) and homogeneity of variance (Levene's test) were verified. One-way ANOVA was used to analyse differences in internet usage across SES and academic achievement level groups, followed by Tukey's HSD post-hoc comparisons to identify specific group differences. Effect sizes were calculated using Cohen's d for the t-test and eta-squared (η^2) for ANOVA, interpreted in accordance with Cohen's (1988) conventions. The significance level was set at $\alpha = .05$ for all tests.

RESULTS

Objective 1: Descriptive Analysis of Internet Usage Patterns

Sample Characteristics

Table 1 presents the demographic composition of the sample. The majority of trainee teachers belonged to the middle SES category (86.0%), with smaller proportions in the high SES (10.5%) and low SES (3.5%) categories. Achievement level was approximately equally distributed across the three tertile groups, with 33.5% in the high, 33.5% in the average, and 33.0% in the low achievement categories.

Table 1 *Demographic Characteristics of the Sample (N = 200)*

Variable	Category	Frequency	Percentage
Gender	Male	82	41.0
	Female	118	59.0
Socio-Economic Status	High	21	10.5
	Middle	172	86.0
	Low	7	3.5
Achievement Level	High (>75%)	67	33.5
	Average (60–75%)	67	33.5
	Low (<60%)	66	33.0

Internet Access, Devices, and Connectivity

All 200 trainee teachers (100%) reported using the internet, confirming universal engagement with online resources within this sample. Table 2 presents device usage: mobile phones were overwhelmingly predominant (79.0%), followed by laptops (13.5%) and desktop computers (6.5%). Home emerged as both the most frequently used location (67.5%) and the most comfortable environment (89.0%) for internet access. Service satisfaction was high, with 91.0% of participants reporting full satisfaction with their internet service.

Table 2 *Primary Devices Used for Internet Access (N = 200)*

Device Type	Frequency	Percentage
Mobile phones	158	79.0
Laptops	27	13.5

Device Type	Frequency	Percentage
Personal computers (desktop)	13	6.5
Tablets / iPads	2	1.0

Duration of Usage and Perceived Usefulness

The modal category for daily internet usage was 1–2 hours (32.0%), and the mean daily usage was 2.4 hours (SD = 1.3). Table 3 presents the full distribution of daily usage duration. The overwhelming majority of participants perceived the internet as helpful (43.5%) or very helpful (42.5%) for academic work, with only 14.0% rating it as less helpful. When asked whether internet use aided the overall teaching-learning process, 86.0% responded affirmatively.

Table 3 *Daily Duration of Internet Usage (N = 200)*

Duration	Frequency	Percentage	Cumulative %
Less than 1 hour	34	17.0	17.0
1–2 hours	64	32.0	49.0
2–3 hours	54	27.0	76.0
3–4 hours	20	10.0	86.0
More than 4 hours	28	14.0	100.0

Note. Mean daily usage = 2.4 hours (SD = 1.3).

Educational Internet Activities

Educational internet usage was extensive and varied. The most frequently reported activities were concept learning (94.5%), exam preparation (94.0%), self-study (94.0%), project completion (93.0%), preparing teaching aids (88.0%), seminar preparation (86.5%), and lesson plan preparation (78.0%). Watching online lectures showed comparatively lower adoption (47.0%). WhatsApp was used by 65.0% of participants for academic purposes, indicating a blurring of social and academic internet use. Of the participants, 64.5% reported having received formal training in internet usage.

Objective 2: Internet Usage by Socio-Economic Status

A one-way ANOVA was conducted to examine whether internet usage scores differed significantly across SES groups. The assumption of homogeneity of variance was verified using Levene's test prior to analysis. Descriptive statistics and ANOVA results are presented in Tables 4 and 5.

Table 4 *Descriptive Statistics for Internet Usage by Socio-Economic Status*

SES Category	n	M	SD	95% CI
High	21	41.52	8.47	[37.68, 45.36]
Middle	172	39.87	9.12	[38.50, 41.24]
Low	7	36.29	7.93	[29.24, 43.34]
Total	200	39.95	9.04	[38.69, 41.21]

Table 5 *One-Way ANOVA Results: Internet Usage by Socio-Economic Status*

Source	SS	df	MS	F	p	η^2
Between Groups	201.44	2	100.72	1.23	.295	.01
Within Groups	16,145.23	197	81.95			
Total	16,346.67	199				

Note. $p > .05$. $\eta^2 = .01$ indicates a negligible effect size. Tukey's HSD post-hoc comparisons revealed no significant pairwise group differences.

The ANOVA results indicated no statistically significant difference in internet usage across SES groups, $F(2, 197) = 1.23$, $p = .295$, $\eta^2 = .01$. The negligible effect size indicates that SES accounted for only 1% of the variance in internet usage scores. Tukey's HSD post-hoc comparisons revealed no significant pairwise differences between any two SES groups. Accordingly, H_{01} was retained.

Objective 3: Internet Usage by Academic Achievement Level

A one-way ANOVA was conducted to examine whether internet usage scores differed across academic achievement level groups. Results are presented in Tables 6 and 7.

Table 6 *Descriptive Statistics for Internet Usage by Academic Achievement Level*

Achievement Level	n	M	SD	95% CI

Achievement Level	n	M	SD	95% CI
High (>75%)	67	42.18	8.76	[40.04, 44.32]
Average (60–75%)	67	39.51	8.92	[37.34, 41.68]
Low (<60%)	66	38.17	9.34	[35.87, 40.47]
Total	200	39.95	9.04	[38.69, 41.21]

Table 7 *One-Way ANOVA Results: Internet Usage by Academic Achievement Level*

Source	SS	df	MS	F	p	η^2
Between Groups	410.27	2	205.14	2.55	.081	.03
Within Groups	15,936.40	197	80.89			
Total	16,346.67	199				

Note. $p > .05$. $\eta^2 = .03$ indicates a small effect size. The comparison between high and low achievement groups approached but did not reach conventional significance levels (Tukey HSD, $p = .065$).

The ANOVA revealed no statistically significant difference in internet usage across achievement levels, $F(2, 197) = 2.55$, $p = .081$, $\eta^2 = .03$. Although a descriptive trend favouring higher achievers was observed, it did not attain statistical robustness. Accordingly, H_{02} was retained.

Objective 4: Internet Usage by Gender

An independent-samples t-test was conducted to examine gender differences in internet usage. Assumptions of normality (Shapiro-Wilk: $p > .05$ for both groups) and homogeneity of variance (Levene's test: $F = 0.34$, $p = .562$) were satisfied. Results are presented in Table 8.

Table 8 *Independent-Samples t-Test: Internet Usage by Gender*

Gender	n	M	SD	t	df	p	d	95% CI
Male	82	39.35	9.28	−0.98	198	.328	0.14	[−3.87, 1.29]
Female	118	40.64	8.87					

Note. $p > .05$. Cohen's $d = 0.14$ indicates a negligible effect size. 95% CI refers to the confidence interval for the mean difference (Male − Female).

No statistically significant gender difference in internet usage was found, $t(198) = -0.98$, $p = .328$, $d = 0.14$. The negligible effect size indicates virtually no practically meaningful difference between genders. Accordingly, H_{03} was retained.

DISCUSSION

Universal Internet Access and Mobile-Centric Usage

The finding that 100% of sampled trainee teachers use the internet represents a remarkable transformation in digital access, contrasting sharply with earlier studies documenting significant access barriers in developing contexts (Warschauer, 2003; Magwa, 2013). The overwhelming dominance of mobile phones (79%) confirms the global trend toward mobile-first digital engagement (Traxler & Wishart, 2011), with important implications for pedagogical design: teacher education institutions must prioritise mobile-optimised learning resources rather than assuming desktop-based access. The predominant preference for home-based internet access (67.5%) and the high comfort level associated with home environments (89%) reflect both the convenience of personal mobile devices and, potentially, the relative inadequacy of institutional digital infrastructure.

Extensive Educational Usage with Limited Online Lecture Integration

Trainee teachers reported extensive internet use for conventional academic tasks—exam preparation (94%), concept learning (94.5%), and project completion (93%)—findings consistent with prior research positioning the internet as a primary academic support tool (Bani, 2005; Sasikala, 2012; Krumsvik, 2014). From a TAM perspective (Davis, 1989), these high usage rates suggest strong perceived usefulness of the internet for core academic tasks. However, the comparatively lower adoption of online lectures (47%) indicates a gap between resource-gathering activities and structured online learning engagement. While the internet has been successfully integrated for information retrieval and conventional task completion, deeper pedagogical integration—particularly multimedia and synchronous learning modalities—remains underdeveloped within this population.

Socio-Economic Status: No Significant Difference Detected in This Sample

The absence of a statistically significant difference across SES groups ($p = .295$, $\eta^2 = .01$) should not be read as evidence that internet usage is equitable across socio-economic strata; rather, it indicates only that no significant difference was detected in this sample. This finding carries limited robustness given the pronounced imbalance in subgroup sizes ($n = 7$ in the low SES category versus $n = 172$ in the middle SES category), which restricts statistical power to detect a true difference were one to exist. With this caveat in mind, and drawing on Digital Divide Theory's emphasis on socio-economic disparities in digital access and usage (van Dijk, 2005), several tentative explanations may be considered. First, the widespread availability

of affordable mobile data in India may have substantially reduced first-level material access divides (Chakraborty & Bosman, 2020). Second, the study population comprises educationally motivated trainee teachers already enrolled in higher education, among whom professional motivations may partially override resource constraints (Hargittai & Hinnant, 2008). Third, it is critical to note that the present study measured usage frequency and breadth, but not quality—SES differences may manifest in second-level divides related to digital skill sophistication, information evaluation, and creative content production (van Deursen & van Dijk, 2014). The highly skewed SES distribution (86% middle SES) also warrants caution regarding statistical power to detect between-group differences involving the small low SES subsample ($n = 7$), and the possibility of Type II error cannot be excluded.

Gender: Convergence in Educational Technology Usage

The finding of no significant gender difference in internet usage ($p = .328$, $d = 0.14$) is consistent with recent literature documenting a narrowing gender gap in educational technology usage among educated populations (Hargittai & Shafer, 2006; Kimbrough et al., 2013). The near-universal adoption of mobile-based internet may have reduced gender-related barriers previously associated with desktop computing environments, providing private and personal access that may be particularly empowering for female users in the Indian sociocultural context (Walton & Donner, 2012). From a TAM perspective (Venkatesh & Morris, 2000), the absence of gender differences suggests that perceived usefulness and ease of use of the internet are comparable across genders, indicating that both male and female trainee teachers regard internet resources as essential and accessible for their professional preparation.

Academic Achievement: Internet Usage as Normalised Practice

The absence of significant differences across achievement levels ($p = .081$, $\eta^2 = .03$), despite a marginal trend favouring higher achievers, suggests that internet usage has become a normalised component of teacher education curricula rather than a differentiating factor. When internet-based tasks are universally embedded in programme requirements, all students—irrespective of achievement level—must engage with digital resources to fulfil mandatory assignments. Critically, the present study measured usage breadth and frequency, not the sophistication, criticality, or quality of usage. Higher achievers may not use the internet more frequently, but may engage more effectively—synthesising information from multiple sources, evaluating source credibility, and applying content to complex pedagogical problems (Bennett et al., 2008; Tamim et al., 2011).

EDUCATIONAL IMPLICATIONS

The recommendations below are offered as implications suggested by the present findings rather than as conclusions directly established by the data, and are intended to inform rather than dictate institutional, individual, and policy decisions.

For Teacher Education Institutions

Given that 79% of trainee teachers access the internet primarily through mobile phones, institutions must prioritise mobile-optimised learning management systems, digital libraries, and assignment submission platforms. Furthermore, while 64.5% of participants reported receiving formal digital training, the 35.5% who relied on informal learning strategies highlight a significant gap in structured digital competency development. Institutions should integrate comprehensive training in advanced digital competencies—evaluating source credibility, synthesising information, creating multimedia pedagogical content, and maintaining digital professionalism—across the B.Ed. curriculum. The comparatively low uptake of online lectures (47%) underscores the need for systematic integration of high-quality online lectures, video demonstrations, and interactive simulations through sustained faculty development in flipped classroom and blended learning models.

For Trainee Teachers

Trainee teachers should cultivate critical evaluation skills to assess the credibility, potential biases, and pedagogical appropriateness of online resources. They should progressively move beyond using the internet primarily for information retrieval toward more sophisticated applications: participating in professional learning communities, creating multimedia teaching resources, and engaging in virtual collaborative projects. National online learning platforms such as SWAYAM, NPTEL, Coursera, and Khan Academy offer valuable supplementary learning opportunities that meaningfully complement formal teacher education programmes.

For Educational Policymakers

While the present findings suggest widespread internet access among trainee teachers, policymakers must ensure continued affordability and geographical expansion of mobile internet services, particularly in rural and underserved areas. National and state educational bodies should invest in developing comprehensive, curriculum-aligned, and culturally relevant online content available in multiple Indian languages. Educational policies should formally mandate digital literacy competencies within teacher education curricula and establish clear, assessable standards for effective digital pedagogy. Ongoing monitoring systems should track usage patterns, digital competency development, and the relationship between technology integration and teaching effectiveness.

CONCLUSION

The present study provides empirical evidence that internet usage has become universal and extensive among trainee teachers in Jammu district, with mobile phones serving as the primary access device and home as the preferred usage environment. Trainee teachers use the internet extensively for conventional educational tasks, though systematic integration of online lectures and multimedia learning resources remains comparatively limited.

The most theoretically significant finding is the absence of statistically significant differences in internet usage across socio-economic status, gender, and academic achievement level. These results should be interpreted as tentative and limited to first-level access patterns: the study measured access, frequency, educational use, and perceived usefulness, but did not assess affordability, digital competence, quality of use, or learning outcomes. Within this limited scope, and considering the small low-SES subsample, the findings offer no more than a preliminary suggestion that first-level access disparities may be narrowing in this context; they should not be read as evidence of broader digital equity. The absence of differences in usage quantity does not imply the absence of differences in usage quality, digital skill sophistication, or the translation of internet usage into meaningful pedagogical outcomes. These represent critical second-level divide dimensions that warrant future investigation.

Grounded in Digital Divide Theory and TAM, this study contributes to the ongoing scholarly discourse on technology integration in teacher education and provides evidence-based insights for institutional policy, curricular design, and professional development. Future research should employ longitudinal designs, mixed-methods approaches, and more nuanced measurements of usage quality, digital competency sophistication, and critical digital literacy to examine how internet engagement during teacher preparation translates into effective technology integration in professional teaching practice.

LIMITATIONS

Several limitations of the present study should be acknowledged when interpreting the findings. First, the sample was drawn exclusively from colleges of education in Jammu district, limiting the generalisability of findings to other regional, cultural, or institutional contexts within India. Second, the cross-sectional design precludes causal inferences regarding the relationships between demographic variables and internet usage. Third, the highly skewed SES distribution—with 86% of participants in the middle SES category and only 7 participants in the low SES category—substantially limits statistical power to detect SES-related differences, increasing the risk of Type II error for SES comparisons. Fourth, the self-report questionnaire is susceptible to social desirability bias and may not fully capture the actual sophistication or quality of

internet usage. Fifth, the composite internet usage score, while internally consistent, may mask differential patterns across specific usage dimensions. Future studies should employ stratified sampling to ensure adequate representation of low SES groups, and should supplement self-report measures with observational or digital trace data to obtain more objective assessments of usage quality.

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