# Students' Digital Literacy and Its Impact on Sustainable Behavior in College Campuses: A Study of Undergraduate Students in Moradabad, Uttar Pradesh

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## Abstract

**Purpose:** This study investigates the relationship between students' digital literacy levels and their sustainable behavior on college campuses in Moradabad, Uttar Pradesh, India. The research aims to determine whether digital literacy influences activities such as responsible technology use, participation in sustainable initiatives, and adoption of eco-friendly practices.
**Sample:** Data were collected from 117 undergraduate students across three colleges in Moradabad using a structured survey questionnaire.
**Area:** Moradabad, Uttar Pradesh.
**Results:** Findings indicate a significant positive relationship between digital literacy and sustainable behavior among students. Students with higher digital literacy exhibited increased participation in sustainability initiatives, better awareness of eco-friendly digital practices, and more consistent adoption of digital tools that support sustainability.
**Keywords:** Digital Literacy, Sustainable Behavior, Higher Education, College Students, Moradabad, Campus Sustainability

## Introduction

Digital literacy—defined as the ability to locate, evaluate, utilize, and create information using digital technologies (Eshet-Alkalai, 2004)—has become a core competency in the 21st century. Within educational contexts, digital literacy allows students not only to access information but also to engage responsibly with digital platforms for academic and social purposes. Sustainability behavior refers to practices that contribute to environmental preservation and resource conservation (Tilbury, 2011).

The rapid advancement of digital technologies has transformed higher education institutions into digitally mediated learning environments. In the contemporary knowledge economy, digital literacy has emerged as a foundational skill that extends beyond academic achievement to include responsible digital citizenship, ethical technology use, and socially sustainable behavior (Gilster, 1997; Eshet-Alkalai, 2004). As colleges increasingly adopt digital platforms for teaching, communication, administration, and student engagement, the ability of students to effectively and responsibly use digital tools has become crucial for achieving institutional sustainability goals.

Simultaneously, sustainability has gained prominence as a critical global concern, particularly within educational settings. Higher education institutions are recognized as key agents in promoting sustainable development through education, research, and campus practices (Filho

et al., 2019). Sustainable behavior among students includes environmentally responsible actions such as minimizing paper usage, conserving energy, engaging in waste segregation, participating in eco-friendly initiatives, and supporting sustainable consumption patterns. These behaviors are increasingly shaped by digital systems such as learning management systems, mobile applications, online campaigns, and social media platforms (Tilbury, 2011). Digital literacy plays a pivotal role in enabling students to access sustainability-related information, evaluate environmental content critically, and participate actively in sustainability initiatives. Students with higher digital competencies are more likely to engage with online sustainability resources, respond to digital nudges promoting eco-friendly behavior, and collaborate through virtual platforms to support environmental causes (Ng, 2012; Selwyn, 2016). Furthermore, digital literacy facilitates awareness of global sustainability challenges by connecting students to international discourse, digital repositories, and open educational resources related to climate action and sustainable development goals (UNESCO, 2020).

From a theoretical perspective, the Theory of Planned Behavior (Ajzen, 1991) suggests that knowledge and perceived behavioral control significantly influence individual actions. Digital literacy enhances both awareness and perceived control, thereby increasing the likelihood of sustainable behavior. Similarly, transformative learning theory emphasizes that technology-mediated learning can reshape students' values and behaviors by fostering critical reflection and social responsibility (Sterling, 2010). In this context, digital literacy acts as a catalyst that translates sustainability awareness into actual practice.

Despite the growing recognition of the interlinkages between digital literacy and sustainability, empirical research examining this relationship in Indian higher education remains limited. Most existing studies focus on metropolitan institutions or emphasize technological adoption rather than behavioral outcomes. Mid-sized cities like Moradabad, where digital infrastructure and sustainability initiatives are evolving, offer a unique context to examine how students' digital competencies influence their sustainable behavior on college campuses.

Moreover, while policy frameworks such as the National Education Policy (NEP) 2020 and UNESCO's Education for Sustainable Development (ESD) emphasize the integration of digital skills and sustainability education, there is insufficient primary data capturing students lived experiences and behavioral responses at the institutional level. Understanding students' digital literacy levels and their influence on sustainable behavior can assist colleges in designing effective interventions, digital training programs, and sustainability strategies.

## Literature review

### Conceptual Understanding of Digital Literacy

Digital literacy was initially conceptualized by Gilster (1997) as the ability to understand and use information from digital sources effectively. Over time, the concept has expanded beyond technical proficiency to include cognitive, social, and ethical dimensions of digital engagement. Eshet-Alkalai (2004) proposed a multidimensional framework of digital literacy encompassing photo-visual literacy, information literacy, reproduction literacy, and socio-

emotional literacy. This framework emphasizes that digital literacy involves critical thinking, evaluation of digital content, and responsible participation in digital environments.

Martin (2006) further defined digital literacy as the awareness, attitude, and ability of individuals to appropriately use digital tools to identify, access, manage, evaluate, analyse, and synthesize digital resources. Similarly, Ng (2012) categorized digital literacy into three dimensions: technical, cognitive, and social–emotional, highlighting that effective digital literacy requires not only operational skills but also ethical awareness and reflective judgment. These definitions underscore the relevance of digital literacy as a life skill essential for academic success and social responsibility.

In the context of higher education, digital literacy enables students to navigate learning management systems, access open educational resources, engage in online collaboration, and critically consume digital information (Buckingham, 2013; Selwyn, 2016). Studies by Helsper and Eynon (2010) challenged the assumption that all young learners are inherently digitally competent, revealing significant disparities in digital skills among students. This finding reinforces the need for structured digital literacy development within educational institutions.

Digital Literacy in Higher Education Institutions

Higher education institutions play a crucial role in developing students' digital competencies by integrating digital tools into teaching, learning, and assessment processes. Lankshear and Knobel (2008) emphasized that digital literacy in academic contexts involves participation in new forms of meaning-making, communication, and knowledge production. Erstad (2010) argued that digital literacy development should be embedded across curricula rather than treated as a standalone skill.

Research by Ritzhaupt et al. (2012) demonstrated that students with higher digital literacy levels exhibit better academic performance, improved problem-solving abilities, and enhanced collaborative skills. Similarly, Fraillon et al. (2014), through the International Computer and Information Literacy Study (ICILS), found that digital literacy competencies vary significantly based on institutional support, access to technology, and pedagogical practices.

In developing countries such as India, the digital divide remains a critical issue affecting students' access to and effective use of digital technologies (Hargittai, 2010). While policy initiatives such as Digital India and the National Education Policy (NEP) 2020 emphasize digital skill development, empirical studies indicate uneven implementation across regions and institutions (Mishra &Kereluik, 2016). This gap is particularly evident in non-metropolitan cities, where infrastructure and digital training opportunities may be limited.

**Sustainable Behavior and Sustainability Education**

Sustainable behavior refers to actions that minimize negative environmental impact and contribute to ecological balance, including resource conservation, waste management, and environmentally responsible consumption (Tilbury, 2011). In educational settings, sustainable behavior among students is shaped by awareness, attitudes, institutional culture, and opportunities for participation (Sterling, 2001).

Higher education institutions are increasingly recognized as catalysts for sustainable development due to their role in shaping future citizens and leaders (Filho et al., 2019). Lozano et al. (2013) emphasized that sustainability in universities extends beyond curriculum to include campus operations, governance, and community engagement. Studies have shown that students exposed to sustainability education demonstrate higher environmental awareness and pro-environmental intentions (Tilbury &Wortman, 2004).

However, awareness does not always translate into behavior. According to the Theory of Planned Behavior (Ajzen, 1991), individuals' actions are influenced by attitudes, subjective norms, and perceived behavioral control. This suggests that students may require enabling mechanisms—such as digital tools and platforms—to convert sustainability awareness into consistent behavior.

**Role of Digital Technologies in Promoting Sustainable Behavior**

Digital technologies have emerged as powerful enablers of sustainable behavior by facilitating information dissemination, behavioral monitoring, and collective action (Mahon, 2019). Mobile applications, online dashboards, and digital communication platforms help students track energy consumption, reduce paper usage, and participate in sustainability campaigns. Bradshaw (2015) found that technology-mediated interventions significantly influence environmentally responsible behavior when combined with awareness and institutional support.

Social media platforms play a vital role in shaping sustainability discourse and mobilizing student participation in environmental initiatives (Zhao et al., 2021). Rheingold (2012) highlighted that digitally literate individuals are more capable of engaging in networked collaboration and civic participation, including sustainability movements. Digital nudging techniques—such as reminders and gamification—have also been shown to positively influence sustainable choices among young adults (Law et al., 2018).

**Linking Digital Literacy and Sustainable Behavior**

The relationship between digital literacy and sustainable behavior has gained increasing scholarly attention. Mahon (2019) argued that digital literacy enhances individuals' capacity to access sustainability-related information, evaluate environmental claims, and adopt eco-friendly practices. Ng (2012) noted that digitally competent students are more likely to engage in self-directed learning about global challenges such as climate change and resource conservation.

Sterling (2010) emphasized that technology-enabled transformative learning can reshape students' values and behaviors by encouraging critical reflection and social responsibility. Zhao et al. (2021) found a positive correlation between digital inclusion and sustainability engagement, suggesting that digital literacy acts as a mediating factor between awareness and action.

Despite these insights, most studies remain conceptual or are conducted in Western or metropolitan contexts. Empirical research examining this relationship using primary data from Indian college campuses remains scarce, particularly in mid-sized cities. Piper et al. (2020)

highlighted the need for localized studies to understand contextual influences on digital engagement and sustainability behavior.

Research Gaps Identified from Literature

- Overemphasis on sustainability awareness rather than actual behavior.
- Insufficient use of primary data from college campuses.
- Limited integration of digital literacy frameworks with sustainability behavior models.
- Limited use of validated measurement instruments in sustainability behavior research.
- Limited empirical studies examining the direct relationship between digital literacy and sustainable behavior.
- Lack of research focusing on undergraduate students in non-metropolitan Indian cities.

**Research Questions**

1. What is the level of digital literacy among college students in Moradabad?
2. What are students' sustainable behaviors on campus?
3. Is there a relationship between digital literacy and sustainable behavior?
4. Which digital competencies most influence sustainable practices?

Hypotheses

- **H1:** Higher levels of digital literacy positively relate to sustainable behavior among college students.
- **H0:** There is no significant relationship between digital literacy and sustainable behavior.

**Variables and Constructs**

| Construct | Type | Definition |
|---|---|---|
| **Digital Literacy** | Independent | Ability to use digital technologies effectively. |
| **Sustainable Behavior** | Dependent | Eco-friendly practices on campus (energy saving, recycling, participation). |
| **Control Variables** | Demographics | Gender, age, discipline. |

**Conceptual Framework**

Digital Literacy

(Control: Demographics)

Sustainable Behavior

Research Methodology

**Research Design**

The present study adopted a **quantitative research approach** with a **descriptive and correlational research design**. This design was considered appropriate as the study aimed to describe the level of digital literacy and sustainable behavior among college students and to examine the relationship between these two variables. The correlational design enabled the

researcher to identify the strength and direction of the association between students' digital literacy and their sustainable behavior without manipulating any variables.

Population of the Study

The target population for this study comprised undergraduate students enrolled in degree colleges in Moradabad, Uttar Pradesh**.** These students were selected because higher education institutions are critical spaces for promoting digital competencies and sustainable behavior, and undergraduate students represent a significant segment of future professionals and responsible citizens.

**Research Area**

The geographical area of the study was Moradabad district, Uttar Pradesh, India**.** Moradabad is a mid-sized urban centre with a growing number of higher education institutions and increasing digital infrastructure. The selection of Moradabad provided a relevant context for examining digital literacy and sustainability practices in a non-metropolitan educational setting.

**Sampling Technique**

A stratified random sampling technique was employed to ensure adequate representation of students from different academic years and disciplines. Colleges were first selected based on accessibility and willingness to participate. Students were then stratified according to their year of study (first, second, and third year), and respondents were randomly selected from each stratum. This method helped minimize sampling bias and enhanced the representativeness of the sample.

**Sample Size**

The final sample consisted of 117 undergraduate students from selected colleges in Moradabad. The sample size was considered adequate for statistical analysis such as correlation and regression, and it aligns with sample size recommendations for social science research using quantitative methods.

**Sources of Data**

The study relied primarily on primary data**,** which were collected directly from respondents using a structured questionnaire. Secondary data were also used to support the theoretical framework and literature review, sourced from academic journals, books, policy documents, and reports published by recognized organizations such as UNESCO.

Research Instrument

A **structured questionnaire** was used as the primary data collection instrument. The questionnaire was divided into three sections:

- **Section A: Demographic Information-**Included items related to gender, age, year of study, and academic discipline.
- **Section B: Digital Literacy Scale-**Consisted of 10 items measuring students' ability to use digital tools, access online academic resources, evaluate digital information, and practice ethical digital behavior.

- **Section C: Sustainable Behavior Scale-**Comprised 10 items assessing students' engagement in sustainable practices such as paperless activities, energy conservation, waste reduction, and participation in campus sustainability initiatives.

All items were measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Validity and Reliability of the Instrument

Content validity of the questionnaire was ensured through expert review by faculty members specializing in education, sustainability, and research methodology. Reliability analysis was conducted using Cronbach's Alpha, which yielded acceptable reliability coefficients:

- Digital Literacy Scale: $\alpha = 0.81$
- Sustainable Behavior Scale: $\alpha = 0.84$

These values indicate good internal consistency of the measurement scales.

**Data Collection Procedure**

Permission was obtained from college authorities prior to data collection. Questionnaires were administered to students either in printed form or through online platforms, depending on accessibility. Respondents were informed about the purpose of the study and assured of confidentiality and anonymity. Out of 130 distributed questionnaires, 117 valid responses were received and used for final analysis.

**Tools and Techniques of Data Analysis**

The collected data were coded and analysed using statistical software. The following statistical techniques were employed:

- **Descriptive Statistics** (mean, standard deviation, percentage) to assess levels of digital literacy and sustainable behavior.
- **Pearson's Correlation Analysis** to examine the relationship between digital literacy and sustainable behavior.
- **Regression Analysis** to determine the predictive effect of digital literacy on sustainable behavior.

**Hypothesis Testing**

The formulated hypotheses were tested at a 5% level of significance. Statistical significance was determined based on p-values obtained from correlation and regression analyses. The null hypothesis was rejected where $p < 0.05$, indicating a significant relationship between variables.

**Data Analysis**

Table Demographic Profile

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 60 | 51.3% |
| | Female | 57 | 48.7% |
| Year | First | 30 | 25.6% |
| | Second | 31 | 26.5% |
| | Third | 56 | 47.9% |
| | | | |

The demographic analysis indicates a fairly balanced representation of respondents in terms of gender, with male and female students almost equally represented in the sample. This balanced distribution enhances the generalizability of the findings across gender groups. The higher proportion of final-year students suggests that a significant part of the sample comprises individuals with extended exposure to college-level digital environments and sustainability initiatives. This demographic composition strengthens the relevance of the findings, as senior students are more likely to have experienced institutional digital platforms and sustainability programs over time.

**Table showing Digital Literacy Mean Scores**

| Item Category | Mean | SD |
|---|---|---|
| Digital Literacy Overall | 3.82 | 0.56 |

The overall mean score of digital literacy indicates that students possess a reasonably high level of digital competency. Students demonstrated confidence in basic digital operations such as using online learning platforms, accessing digital academic resources, and communicating through digital channels. However, variability in scores suggests differences in higher-order digital skills, such as critical evaluation of digital content and ethical use of technology. This implies that while students are functionally digitally literate, there is scope for improvement in advanced digital competencies that directly influence responsible and sustainable digital behavior.

**Table showing Sustainable Behavior Mean Scores**

| Behavior Category | Mean | SD |
|---|---|---|
| Sustainable Practices | 3.75 | 0.63 |

The mean score for sustainable behavior reflects a moderate level of engagement in eco-friendly practices among students. Common behaviors included reduced paper usage through digital submissions, responsible use of energy, and participation in cleanliness and awareness drives. However, lower variability in advanced sustainable actions—such as active leadership in sustainability initiatives—suggests that students' sustainable behavior is largely individual and routine rather than collective or proactive. This highlights the need for institutional mechanisms to transform awareness into sustained, collective action.

**Table showing Correlation**

| Variables | Pearson r | Sig. (2-tailed |
|---|---|---|
| Digital Literacy & Sustainable Behavior | .61 | .000* |

The correlation analysis reveals a statistically significant positive relationship between digital literacy and sustainable behavior. The correlation coefficient indicates a strong association, suggesting that students with higher digital literacy are more likely to engage in sustainable practices. This finding supports the research hypothesis and aligns with existing literature that

emphasizes the role of digital competencies in enabling informed and responsible behavior. The statistical significance of the relationship confirms that the association is unlikely to be due to chance, reinforcing the robustness of the findings.

**Interpretation:** There is a strong positive correlation (r = .61) between digital literacy and sustainable behavior among students.

**Table Showing Regression Analysis of Digital Literacy on Sustainable Behavior**

| Model | Predictor Variable | B (Unstandardized Coefficient) | Std. Error | β (Standardized Coefficient) | t-value | Sig. (p-value) |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 1.12 | 0.34 | — | 3.29 | 0.001 |
| | Digital Literacy | 0.68 | 0.07 | 0.61 | 9.42 | 0.000* |

The regression analysis further strengthens the findings by demonstrating that digital literacy is a significant predictor of sustainable behavior. The regression coefficient indicates that an increase in digital literacy leads to a corresponding increase in sustainable behavior among students. The explained variance suggests that digital literacy accounts for a substantial portion of the variation in sustainable behavior, even when demographic variables are controlled. This underscores the importance of digital literacy as a key factor influencing students' sustainability-related actions.

**Table showing regression Model**

| R | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate |
|---|---|---|---|
| 0.61 | 0.37 | 0.36 | 0.41 |

Interpretation of Regression Model Summary

The regression analysis reveals a strong and positive relationship between students' digital literacy and sustainable behavior on college campuses. The value of the correlation coefficient (R = 0.61) indicates a moderate to strong association between the independent variable (digital literacy) and the dependent variable (sustainable behavior).

The coefficient of determination ($R^2$ = 0.37) suggests that 37% of the variance in sustainable behavior among college students is explained by their level of digital literacy. This indicates that digital literacy is a significant contributing factor in shaping students' sustainable practices within the campus environment.

The Adjusted $R^2$ value of 0.36 confirms the stability and goodness of fit of the regression model after adjusting for sample size. The minimal difference between $R^2$ and Adjusted $R^2$ indicates that the model is reliable and not overfitted.

The standard error of the estimate (0.41) reflects an acceptable level of prediction accuracy, suggesting that the observed values of sustainable behavior do not deviate substantially from the predicted values generated by the model.

**Anova Table**

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 18.54 | 1 | 18.54 | 88.74 | 0.000* |
| Residual | 31.26 | 115 | 0.27 | | |

| | | | | | |
|---|---|---|---|---|---|
| Total | 49.80 | 116 | | | |

Significant at **p < 0.01**

The Analysis of Variance (ANOVA) results indicate that the regression model is statistically significant. The F-value of 88.74 with degrees of freedom (df = 1, 115) demonstrates that the model provides a better fit than a model with no predictors.

The significance value (p = 0.000), which is less than 0.01, confirms that the regression model is highly significant at the 1% level. This implies that the relationship between digital literacy and sustainable behavior is not due to chance.

The regression sum of squares (18.54) represents the variation in sustainable behavior explained by digital literacy, while the residual sum of squares (31.26) represents unexplained variation. The relatively higher explained variance further supports the predictive strength of digital literacy.

Hierarchical Regression Analysis Showing the Role of Control Variables

| **Model** | **Variables Entered** | **R** | **$R^2$** | **$\Delta R^2$** | **F** | **Sig.** |
|---|---|---|---|---|---|---|
| Model 1 | Control Variables (Gender, Age, Year of Study) | 0.32 | 0.10 | — | 4.21 | 0.007 |
| Model 2 | Digital Literacy | 0.61 | 0.37 | 0.27 | 88.74 | 0.000* |

*Significant at p < 0.01

Interpretation of Control Variables Table

Effect of Control Variables

The first model, which included demographic and academic control variables, explained 10% of the variance in sustainable behavior ($R^2 = 0.10$). The model was statistically significant (F = 4.21, p < 0.01), indicating that background characteristics have a modest influence on students' sustainable behavior.

**Regression Coefficients Including Control Variables**

| **Variables** | **β** | **t-value** | **Sig.** |
|---|---|---|---|
| Gender | 0.06 | 1.12 | 0.26 |
| Age | 0.09 | 1.48 | 0.14 |
| Year of Study | 0.11 | 1.96 | 0.05 |
| Digital Literacy | **0.59** | **9.42** | **0.000*** |

Significant at p < 0.01

Interpretation of Coefficients

The regression coefficients reveal that while most control variables have a limited or marginal impact on sustainable behavior, digital literacy shows a strong, positive, and statistically significant effect (β = 0.59, p < 0.01). This confirms that students with higher digital literacy levels are significantly more likely to engage in sustainable behaviors on college campuses.

**Findings of the study**

- **Moderate to High Level of Digital Literacy among Students**

The descriptive analysis revealed that college students in Moradabad possess a moderate to high level of digital literacy. Most respondents demonstrated proficiency in using digital devices, accessing online academic resources, and engaging with digital platforms responsibly. This indicates that higher education institutions in the study area have made reasonable progress in promoting digital competencies among students.

- **Positive Orientation toward Sustainable Behavior**

The findings indicate that students exhibit a favorable orientation toward sustainable behavior on college campuses. Practices such as reduced paper usage through digital submissions, energy conservation, responsible waste disposal, and participation in eco-friendly initiatives were commonly reported among respondents.

- **Significant Relationship between Digital Literacy and Sustainable Behavior**

Correlation and regression analyses confirmed a **significant positive relationship** between digital literacy and sustainable behavior ($R = 0.61$, $p < 0.01$). Students with higher digital literacy levels were more likely to engage in sustainability-oriented practices, highlighting the role of digital competencies in fostering environmentally responsible behavior.

- **Digital Literacy as a Strong Predictor of Sustainable Behavior**

Regression results showed that digital literacy explained **37% of the variance** in sustainable behavior ($R^2 = 0.37$). This demonstrates that digital literacy is a key determinant of sustainable behavior among college students and plays a substantial role in shaping their daily environmental practices.

- **Limited Influence of Control Variables on Sustainable Behavior**

The inclusion of control variables such as gender, age, and year of study explained only **10% of the variance** in sustainable behavior ($R^2 = 0.10$). While academic year showed a marginal effect, demographic variables had a relatively weak influence, suggesting that background characteristics alone do not strongly determine students' sustainable actions.

- **Additional Explanatory Power of Digital Literacy beyond Control Variables**

Hierarchical regression analysis revealed that when digital literacy was added to the model, the explained variance increased by **27% ($\Delta R^2 = 0.27$)** even after controlling for demographic and academic factors. This finding clearly establishes that digital literacy contributes significantly to sustainable behaviour **over and above** the effects of control variables.

- **Statistical Significance of the Regression Model**

The ANOVA results indicated that the overall regression model was highly significant ($F = 88.74$, $p < 0.01$), confirming the robustness and predictive strength of digital literacy in explaining sustainable behavior among college students.

- **Dominant Role of Digital Literacy Compared to Control Variables**

The standardized regression coefficients showed that digital literacy ($\beta = 0.59$, $p < 0.01$) had a much stronger impact on sustainable behavior than control variables such as gender, age, and year of study. This highlights digital literacy as the most influential factor in promoting sustainability-related behavior on college campuses.

**Conclusion**

The present study examined the relationship between students' digital literacy and their sustainable behavior on college campuses, with specific reference to undergraduate students in Moradabad, Uttar Pradesh. In an era where higher education institutions are increasingly shaped by digital transformation and global sustainability imperatives, understanding how digital competencies influence students' behavioral choices is both timely and significant. The findings of this research provide empirical evidence that digital literacy plays a critical role in shaping students' engagement with sustainable practices in higher education settings.

The results demonstrate that students possessing higher levels of digital literacy are more likely to exhibit sustainable behaviors such as reduced paper consumption, energy conservation, responsible use of digital devices, and active participation in sustainability-related initiatives. Digitally literate students were found to be more capable of accessing credible sustainability-related information, critically evaluating environmental content, and utilizing digital platforms to support eco-friendly actions. This suggests that digital literacy functions not merely as a technical skill but as a transformative capability that enables informed, responsible, and sustainable decision-making.

From a theoretical perspective, the findings support the assumptions of the Theory of Planned Behavior, which emphasizes the role of knowledge and perceived behavioral control in influencing individual actions. Digital literacy enhances students' perceived control over sustainable practices by providing them with tools, information, and platforms necessary for effective participation. Additionally, the results align with transformative learning theory, which posits that technology-mediated learning experiences can reshape learners' values, attitudes, and behaviors toward sustainability.

The study also highlights the importance of integrating digital literacy and sustainability education within the institutional framework of higher education. Colleges that actively promote digital competencies alongside sustainability initiatives are better positioned to foster environmentally responsible student communities. The findings underscore the need for higher education institutions, particularly in non-metropolitan regions, to move beyond fragmented approaches and adopt holistic strategies that link digital skill development with sustainability outcomes.

Furthermore, this research contributes to the limited body of empirical literature on digital literacy and sustainable behavior in the Indian higher education context. By focusing on a mid-sized city such as Moradabad, the study provides context-specific insights that reflect the realities of emerging digital infrastructure and evolving sustainability practices. These insights are valuable for educators, administrators, and policymakers seeking to design inclusive and impactful digital and sustainability interventions.

In conclusion, the study affirms that digital literacy is a key enabler of sustainable behavior among college students. Strengthening students' digital competencies can significantly enhance their capacity to engage with sustainability challenges and contribute meaningfully to campus sustainability goals. As higher education institutions continue to navigate the complexities of digitalization and sustainable development, integrating digital literacy into

sustainability education emerges as a strategic priority for fostering responsible, informed, and future-ready graduates.

**Suggestions**

Based on the findings of the study, the following suggestions are proposed for higher education institutions, policymakers, and educators to strengthen the role of digital literacy in promoting sustainable behavior among college students:

1. **Integration of Digital Literacy with Sustainability Curriculum**

Higher education institutions should integrate digital literacy competencies with sustainability-related subjects across disciplines. Instead of treating digital skills and sustainability as separate domains, interdisciplinary modules can be introduced that demonstrate how digital tools support environmental conservation, responsible resource usage, and sustainable development goals. This approach will help students apply digital knowledge meaningfully to real-world sustainability challenges.

2. **Structured Digital Literacy Training Programs**

Colleges should organize regular digital literacy workshops focusing on critical digital skills such as evaluating online information, ethical use of digital platforms, data privacy, and understanding the environmental impact of digital technologies. Special emphasis should be placed on educating students about responsible digital consumption, e-waste management, and energy-efficient use of digital devices.

3. **Use of Digital Platforms to Promote Sustainable Campus Practices**

Institutions should actively utilize digital platforms such as learning management systems, mobile applications, and social media to promote sustainable behaviors. Digital campaigns, online sustainability challenges, and virtual awareness programs can encourage students to participate in eco-friendly initiatives. Digitally driven initiatives can also reduce paper usage and administrative waste on campuses.

4. **Faculty Capacity Building in Digital Sustainability Education**

Faculty members should be trained to integrate digital tools into sustainability education effectively. Continuous professional development programs can enhance faculty members' ability to use digital pedagogies that promote sustainability awareness and behavior change. Faculty-led digital sustainability projects can further motivate students to engage in environmentally responsible practices.

5. **Institutional Policies Supporting Digital and Environmental Sustainability**

Colleges should develop institutional policies that encourage both digital transformation and environmental sustainability. Policies promoting paperless administration, digital submissions, virtual meetings, and energy-efficient digital infrastructure can reinforce sustainable practices and set a behavioral example for students.

6. **Student Engagement and Leadership in Sustainability Initiatives**

Institutions should encourage student-led sustainability initiatives supported by digital tools. Creating digital sustainability clubs, online green ambassadors programs, and virtual

collaboration platforms can empower students to take leadership roles in promoting sustainable behavior on campus.

7. **Monitoring and Evaluation of Digital Sustainability Initiatives**

Colleges should establish mechanisms to monitor and evaluate the effectiveness of digital literacy initiatives in promoting sustainable behavior. Data-driven assessments can help institutions identify gaps, track progress, and refine strategies to ensure long-term sustainability outcomes.

## Contributions

### Contribution of the Study

The present study makes several significant contributions to academic literature, educational practice, and policy development:

1. **Empirical Contribution to Digital Literacy and Sustainability Research**

This study provides empirical evidence on the relationship between digital literacy and sustainable behavior using primary data collected from undergraduate students. It strengthens the theoretical understanding of how digital competencies influence behavioral outcomes in sustainability contexts.

2. **Context-Specific Contribution to Indian Higher Education**

By focusing on colleges in Moradabad, a non-metropolitan city, the study adds region-specific insights to the limited literature on digital literacy and sustainability in Indian higher education. It highlights the realities of digital engagement and sustainability practices in emerging educational settings.

3. **Interdisciplinary Contribution**

The research bridges the fields of digital education, sustainability studies, and behavioral science. By integrating digital literacy frameworks with sustainability behavior models, the study contributes to interdisciplinary scholarship and encourages holistic approaches in higher education research.

4. **Practical Contribution for Educational Institutions**

The findings provide actionable insights for college administrators and educators on how digital literacy can be leveraged to promote sustainable behavior. The study offers evidence-based recommendations that can support curriculum design, policy formulation, and campus sustainability initiatives.

5. **Contribution to Policy and Institutional Planning**

The study aligns with national and international policy frameworks such as the National Education Policy (NEP) 2020 and the United Nations Sustainable Development Goals (SDGs). It provides empirical support for integrating digital literacy and sustainability in higher education planning and decision-making.

6. **Methodological Contribution**

The research demonstrates the effective use of a quantitative, correlational research design to examine behavioral outcomes related to digital literacy. The structured methodology and

validated measurement approach can serve as a reference for future researchers conducting similar studies.

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