Digital Literacy and Youth Empowerment in the Garo Hills of Meghalaya

A Study on the Role of Technology in Education

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Abstract. In the contemporary digital age, literacy is no longer limited to reading and writing-it increasingly includes the ability to effectively access, understand, and utilize digital technologies. Digital literacy is increasingly recognized as a foundational skill for youth development and empowerment, especially in the context of education and employment. In regions like the Garo Hills of Meghalaya, where geographical isolation and limited infrastructure present unique challenges, the integration of digital tools in education can significantly impact the future of the region's youth. This study aims to assess the level of digital literacy among youth in the Garo Hills, assess the availability and use of technology in educational institutions, and analyse the role digital literacy plays in empowering youth socially and economically. Ultimately, this study seeks to offer practical recommendations for stakeholders to enhance digital learning and promote equitable digital empowerment in tribal and rural educational contexts.

Keywords: Digital literacy, Youth empowerment, Role of Technology, Literature review, Digital empowerment

1 Introduction

In the twenty-first century, literacy has undergone a fundamental transformation. Traditionally defined as the ability to read and write, literacy now encompasses a much broader range of skills needed to function in an increasingly digital and information-rich society. The rapid diffusion of information and communication technologies (ICTs) has redefined literacy to include digital competencies such as navigating digital devices, critically evaluating online information, creating and sharing content, and engaging safely in digital environments (Ng, 2012). This new form of literacy, often referred to as digital literacy, is not only a technical skill but also a social practice that enables participation in education, the economy, and civic life (Gilster, 1997; Hargittai, 2010).

Globally, digital literacy is considered essential for youth, who are regarded as the most dynamic demographic group in driving socio-economic change. Yet the assumption that young people are "digital natives" with automatic mastery of digital skills has been challenged (Hargittai, 2010). Evidence shows that while young people may be active users of social media and smartphones, their ability to engage critically and productively with digital tools varies widely across socio-economic backgrounds, geographies, and levels of educational attainment. Scholars such as van Dijk (2020) argue that this disparity reflects the persistence of a "second-level digital divide," where inequalities are not only about access to devices but also about differences in skills, usage patterns, and outcomes.

The importance of digital literacy for youth empowerment is well-documented in development literature. Youth who possess strong digital skills are better positioned to access employment opportunities, participate in digital economies, and engage in entrepreneurial activities (World Bank, 2016). Digital literacy also strengthens social connectedness, enhances civic participation, and provides young people with tools to express their voices in public life (Van Dijk, 2020). In low-resource settings, digital skills are increasingly regarded as a pathway to empowerment, enabling marginalized communities to overcome structural disadvantages and connect with global knowledge systems (Tripathi et al., 2024).

India presents an interesting case study in the adoption of digital literacy as a national development priority. With one of the world's largest youth populations, India has recognized that digital empowerment is central to inclusive growth. Flagship initiatives such as *Digital India* and the *Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)* have been launched to provide digital infrastructure, expand internet access, and deliver digital literacy training to rural households (India.gov.in, 2021). PMGDISHA, in particular, aims to make at least one member of every rural household digitally literate, reflecting a policy commitment to bridging the rural-urban

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digital divide. Complementing these initiatives, the *DIKSHA* platform (Digital Infrastructure for Knowledge Sharing) provides teachers and students with open-access resources and professional development modules, making ICT integration into classrooms more systematic (Government of India, 2023.).

Despite these advances, national assessments show persistent gaps. The *Annual Status of Education Report (ASER) 2023* highlights that although smartphone ownership in rural India has grown rapidly, critical competencies such as safe online practices, digital problem-solving, and information evaluation remain weak (ASER Centre, 2023). Gender disparities are particularly evident, with young women reporting less access to devices and less confidence in their digital abilities compared to men (ASER Centre, 2023). This demonstrates that providing devices alone is insufficient; meaningful digital inclusion requires sustained investments in training, pedagogy, and localized content.

The challenges are even more acute in India's tribal and geographically isolated regions, such as the Garo Hills of Meghalaya. Characterized by rugged terrain, dispersed settlements, and limited infrastructure, the Garo Hills face significant barriers to digital adoption (Chaifry, 2025). Schools often have limited ICT resources, intermittent electricity, and poor internet connectivity, while teachers frequently lack training in digital pedagogy (Borah, 2019). Moreover, the linguistic and cultural diversity of the region underscores the need for localized digital content in Garo and Khasi languages, which remains scarce.

Although the state government has adopted the National Education Policy (NEP) 2020 and implemented initiatives under *Samagra Shiksha* to enhance digital readiness, progress remains uneven. For example, during the COVID-19 pandemic, the DIKSHA platform was rolled out to provide digital learning resources, but many rural students were unable to benefit due to lack of connectivity and digital skills. Similarly, device distribution programs, such as the 2025 M-TAB initiative in South West Garo Hills that provided digital learning tablets to secondary students, have demonstrated the state's commitment but also highlighted ongoing challenges: devices often remain underutilized due to inadequate training and lack of supportive infrastructure (India Today NE, 2025).

Yet, despite these structural barriers, the potential of digital literacy for youth empowerment in the Garo Hills is significant. As Tripathi et al. (2024) note in their evaluation of rural digital literacy interventions, programs that combine devices, structured training, mentorship, and relevant local content produce measurable impacts on employability, entrepreneurship, and self-efficacy. In similar rural contexts, youth exposed to digital literacy programs report increased ability to search for jobs online, manage small businesses through digital platforms, and participate more actively in community initiatives. These findings suggest that digital literacy is not merely a technical skill but a transformative tool for socio-economic and cultural participation.

Against this backdrop, the present study seeks to examine digital literacy as a driver of youth empowerment in the Garo Hills of Meghalaya. Specifically, the study aims to assess: (a) the level of digital literacy among youth; (b) the availability and use of technology in educational institutions; (c) the role of digital literacy in empowering youth socially and economically; and (d) practical recommendations to enhance digital learning and promote equitable digital empowerment in tribal and rural educational contexts. By situating the analysis within the unique socio-cultural and infrastructural conditions of the Garo Hills, this study contributes to a more nuanced understanding of digital literacy as both an educational and empowerment tool.

2 Problem Identification

Although digital literacy is globally recognized as essential for youth empowerment, rural and tribal regions in India remain disadvantaged. National initiatives such as *Digital India*, PMGDISHA, and *DIKSHA* have expanded access, yet rural youth often lack critical skills in information evaluation, online safety, and digital problem-solving (ASER Centre, 2023; Government of India, 2023). In Meghalaya's Garo Hills, challenges are compounded by poor infrastructure, limited teacher training, and scarce localized content (Borah, 2019; Chaifry, 2025). Even when devices are distributed, such as in the M-TAB program, impact is constrained by inadequate support systems (India Today NE, 2025). At the same time, digital competencies are proven to enhance employability, entrepreneurship, and social participation (Tripathi et al., 2024; van Dijk, 2020). The core problem lies in the lack of systematic evidence on digital literacy levels, institutional ICT resources, and the empowerment outcomes of digital skills among youth in the Garo Hills. Without such evidence, policies risk overlooking the region's unique socio-cultural and infrastructural needs, thereby perpetuating the digital divide.

Therefore, this study identifies the problem as the limited understanding of the level of digital literacy, the availability and use of ICT in educational institutions, and the relationship between digital skills and youth empowerment in the Garo Hills of Meghalaya. By addressing this gap, the research provides the necessary evidence base to inform policies and practices that can promote equitable digital empowerment in tribal contexts.

3 Review of Literature

This review aims to appraise and evaluate the available literature on digital literacy as a driver of youth empowerment in the Garo Hills of Meghalaya. A thematic review of related literature has been presented in the following paragraphs to highlight the gap of the proposed study.

3.1 Conceptualizing Digital Literacy

The concept of digital literacy has evolved significantly since its early formulations. Gilster (1997) described digital literacy as the "ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers." This definition emphasized comprehension and use of digital information but largely reflected the technological landscape of the 1990s, when access to the internet and personal computers was limited. Since then, the rapid expansion of the digital ecosystem has necessitated broader, multidimensional understandings. Ng (2012) proposed a widely cited framework comprising three dimensions: technical**,** cognitive**,** and socio-emotional literacy. Technical literacy involves operating digital devices and software applications; cognitive literacy includes information evaluation, problem-solving, and knowledge creation; and socio-emotional literacy refers to online communication, ethical participation, and digital citizenship. This multidimensional model highlights that digital literacy is not merely about technical proficiency but also about critically and responsibly engaging in digital environments.

Critiques of the so-called "digital native" assumption further reinforce the importance of this broader understanding. Hargittai (2010) and Helsper and Eynon (2013) argue that the ability of young people to use digital technologies varies widely depending on socio-economic status, education, and access, challenging the notion that all youth are equally digitally competent. This perspective underscores the importance of contextual research in rural and marginalized regions, where disparities in access and skill acquisition are most pronounced.

3.2 Theoretical Perspectives on Digital Literacy

Several theoretical frameworks guide the analysis of digital literacy and its role in empowerment. Van Dijk's Resources and Appropriation Theory (2005, 2020) identify four stages of digital engagement: access, skills, usage, and outcomes. According to this model, inequalities occur not only in physical access but also in the appropriation of skills and the benefits derived from use. This framework is particularly relevant to rural India, where device ownership may increase but empowerment outcomes remain limited due to weak institutional support and low levels of advanced digital skills. Warschauer's ICT-for-Development model (2003) emphasizes that digital inclusion requires more than technology distribution. It requires a convergence of physical resources**,** digital skills**,** content relevance, and social support systems such as trained teachers and enabling institutions. This aligns closely with findings from rural India, where one-off device distribution programs often fail without concurrent investments in training and localized content (Tripathi et al., 2024).

Both frameworks provide a useful lens for examining the Garo Hills context, where infrastructural constraints, limited teacher capacity, and socio-cultural specificities shape the extent to which youth can meaningfully appropriate digital technologies.

3.3 Digital Literacy and Youth Empowerment

A growing body of research links digital literacy to diverse forms of youth empowerment. In education, digital literacy enhances access to online resources, improves independent learning, and fosters higher-order thinking

skills (Ng, 2012). In employment, digital competencies are associated with employability, entrepreneurial capacity, and access to online job markets (World Bank, 2016). Studies in low-income countries demonstrate that digital literacy enables youth to participate in online freelancing, digital entrepreneurship, and globalized value chains (UNESCO, 2018).

From a social empowerment perspective, digital tools expand opportunities for social connectedness, civic engagement, and advocacy. For instance, van Dijk (2020) argues that digital skills enhance participation in democratic processes by enabling youth to access government portals, engage in digital campaigns, and amplify marginalized voices. Moreover, digital literacy contributes to self-efficacy—the belief in one's capacity to succeed—by fostering confidence in navigating new technologies and adapting to rapidly changing digital environments (Bandura, 1997; Tripathi et al., 2024). However, empowerment outcomes are not automatic. Warschauer (2003) emphasizes that structural inequalities—such as poverty, gender discrimination, and institutional deficits—mediate the extent to which digital literacy translates into empowerment. Thus, empowerment must be understood as both a technical and social process requiring enabling environments.

3.4 Empirical Evidence in Rural India and Garo Hills Context

Empirical research on digital literacy and youth empowerment in rural and underbanked regions has grown significantly in the past decade, providing critical insights into the ways digital literacy can bridge technological gaps in empowering the youth. Numerous studies have quantitatively assessed the relationship between digital literacy and youth empowerment suggesting that digital literacy directly influences both economic opportunities and social engagement (Tripathi et al., 2024; van Dijk, 2020).

Empirical studies across rural India increasingly underline how digital literacy affects youth outcomes—and how program design, context, and demographic factors influence success. For instance, Kumar and Muthuswamy (2021) conducted a cluster-randomized trial in Tamil Nadu involving 2,400 students who received tablet-based math instruction with teacher training. They found a statistically significant improvement in numeracy skills—increasing test scores by 0.24 standard deviations over one academic year—suggesting that paired tech and teacher support can enhance learning. In Bihar, Singh and Jain (2022) evaluated a blended mobile-based adult learning program across rural blocks and saw literacy rate improvements of 15% among participants, especially women, versus 4% in control blocks. In Maharashtra's tribal areas, Bhagat et al., (2021) surveyed 1,200 high school students and found that only 21% could use spreadsheets or online search effectively, despite 68% household smartphone access; lack of training, electricity, and digital content in Marathi were cited as key barriers. Similarly, Raju and Chopra (2023) studied 500 students across rural Rajasthan and observed that those who received weekly computer lab sessions (45 minutes/day over a semester) outperformed peers by 0.30 standard deviations in digital competence tests, which translated into higher rates of completing online application forms independently. In rural West Bengal, Basu and Mukhopadhyay (2022) implemented a quasi-experimental community ICT centre embedded in women's self-help groups (SHGs) across 10 villages ($n \approx 800$ women). The centre offered basic digital training and assisted with applications for government schemes. Post-intervention, digitally trained SHG members applied for benefits 3.5 times more often than non-participating SHGs and reported greater confidence in navigating e-government portals. In Odisha, Pradhan et al. (2020) assessed a government tablet distribution scheme by surveying 2,000 households across remote districts. They found only moderate usage for educational purposes—but where teacher facilitation existed (in ~30% of schools), student engagement increased by over 50%.

Beyond India-specific evaluations, reviews of NGO and university-led pilot projects demonstrate replicable strategies. A case study in rural Madhya Pradesh by Verma and Singh (2022) documented how pairing local language content with mobile sessions boosted problem-solving task performance by 0.4 standard deviations among 400 adolescent users. Another rural entrepreneurship study in Karnataka (Ramesh et al., 2021) followed 300 youth trained in digital marketing and found a 25% increase in their micro-enterprise revenue over six months. These findings reinforce that rural Indian contexts can yield measurable digital empowerment—when programs are context-sensitive, pedagogically supported, and locally relevant.

Meghalaya's Garo Hills region faces distinctive challenges: hilly terrain, dispersed settlements, limited broadband infrastructure, and linguistic diversity (Chaifry, 2025). Although the state has adopted the NEP 2020 and initiated ICT integration in schools, gaps in connectivity, teacher ICT skills, and culturally relevant e-learning resources persist (Meghalaya School Education Authority, n.d.). During the COVID-19 pandemic, DIKSHA-based initiatives and device-distribution schemes—such as the 2025 M-TAB program in South West Garo Hills—

provided valuable lessons on both the potential and the limitations of rapid digital rollouts (India Today NE, 2025). These efforts demonstrated that without sustained teacher training, community support, and locally relevant content, device use often remains limited to basic functions.

Existing research offers insights into national and rural-level digital literacy but lacks context-specific evidence for the Garo Hills. There is little empirical work examining how youth in this tribal region use digital tools, how institutions support digital learning, and how digital literacy translates into empowerment outcomes such as employability and social participation. Addressing this gap is crucial to designing policies and practices suited to the region's socio-cultural and infrastructural realities.

4 Objectives of the Study

The main objective of the study is to examine digital literacy as a driver of youth empowerment in the Garo Hills of Meghalaya. The specific objectives of the paper are:

(1) To study the access and level of digital literacy among youth in the Garo Hills of Meghalaya.
(2) To study the availability and use of technology in educational institutions.
(3) To study the role of digital literacy in empowering youth socially and economically.

5 Research Methodology

5.1 Research Design

The study employs a descriptive survey design to examine the relationship between digital literacy and youth empowerment among students. A purely quantitative approach is adopted, with a structured questionnaire as the primary data collection tool.

5.2 Population

The population of the study comprises students aged 15–24 years enrolled in secondary schools and colleges in the Garo Hills region of Meghalaya. This age group is chosen because it represents youth at a critical stage of transition from schooling to higher education and employment, where digital literacy has direct implications for empowerment.

5.3 Sampling Technique

A stratified random sampling technique is used to ensure representativeness. Schools and colleges are stratified based on type (government, private, and missionary institutions) and location (rural and semi-urban). From each stratum, institutions are randomly selected, and students are then chosen proportionately. This approach ensures adequate representation across gender, institution type, and geographical distribution.

5.4 Sample Size Determination

The sample size is calculated using Cochran's formula:

$$n_0 = \frac{z^2.p.(1-p)}{e^2}$$

where:
z = 1.96 for a 95% confidence level
p = 0.5 (assumed proportion for maximum variability)
e = 0.05 (margin of error)

$$n_0 = \frac{(1.96)^2.0.5.0.5}{(0.05)^2} = 384.16$$

Thus, the minimum required sample size is approximately 384 students. To account for non-responses or incomplete questionnaires, the final sample size is rounded up to 400 students.

5.5 Data Collection Tool

A structured questionnaire is used as the sole instrument for data collection. It contains four sections:

- Demographic Information
- Digital Access
- Digital Literacy Skills
- Digital Literacy and Youth Empowerment

5.6 Data Collection Procedure

The questionnaire is administered directly to students in classrooms with prior permission from the school or college administration. The researcher explains the purpose of the study, ensures voluntary participation, and supervises the completion of the survey to minimize response errors.

6 Analysis and Findings

6.1 Socio-Demographic profile of the respondents

The socio-demographic profile of respondents reveals important insights into the context of digital literacy and youth empowerment. In terms of gender, the study included more males (57%) than females (43%), reflecting a slightly male-dominated sample. This difference is significant in light of existing gender disparities in technology access and usage, especially in developing contexts, where girls and young women often face barriers such as cultural restrictions, lack of resources, or limited digital training opportunities. The relatively strong female representation, however, indicates growing participation of women in digital spaces, which could point to gradual progress in closing the digital gender gap.

Age distribution shows that the majority of respondents were in the 18–20 age group (38%), followed by those aged 21–24 (34%), with a smaller proportion (28%) aged 15–17. This pattern highlights that the bulk of participants are young adults in higher secondary and early tertiary education, which is the age group most actively engaging with digital technologies. Their formative years are also critical for empowerment, as access to digital skills can expand their career prospects, academic success, and civic participation. The inclusion of adolescents aged 15–17 is also valuable since they represent the entry point into formal exposure to digital literacy, particularly through secondary schooling.

The findings on educational background show that nearly half of the respondents (49%) were secondary school students, while 29% were undergraduates and 22% were vocational learners. This mix suggests that digital literacy is not confined to college students but is also a concern among school and vocational-level youth. Secondary students being the majority is noteworthy because they often rely heavily on school-provided resources for digital access, while undergraduates and vocational learners may have more autonomy in using digital tools. Vocational learners' inclusion is important since digital skills can directly enhance employability in technical and skilled trades, contributing to economic empowerment.

Place of residence shows a near balance between urban (52%) and rural (48%) respondents. This is critical for analysing rural–urban divides in digital access and empowerment. While urban students generally enjoy greater access to digital infrastructure, rural students often face challenges such as poor connectivity, inadequate training facilities, and socio-economic barriers. The near-equal distribution provides a robust base for comparing how residence influences digital literacy outcomes, and whether digital inclusion policies are effectively bridging the urban–rural divide.

One of the most striking findings relates to electricity supply, where 54% of respondents reported regular access, 31% intermittent supply, and 15% no electricity at all. This indicates that despite the spread of digital technologies, infrastructural inequalities remain a major barrier to digital empowerment. Reliable electricity is a prerequisite for meaningful access to digital devices and the internet, and its absence could severely limit opportunities for rural and low-income students. For example, students with no or intermittent power may struggle with online classes, e-learning, or even basic tasks such as charging their devices, thereby widening educational inequalities. Table 1 presents the socio-demographic profile of the respondents.

Table 1. Socio-Demographic Profile of the Respondents

Variables	Category	Frequency	Percentage (%)
Gender	Male	219	57
	Female	165	43
	Total	384	100
Age	15-17	109	28
	18-20	144	38
	21-24	131	34
	Total	384	100
Educational Level	Secondary School	187	49
	Undergraduate	111	29
	Vocational	86	22
	Total	384	100
Place of Residence	Urban	201	52
	Rural	183	48
	Total	384	100
Education Level	Regular Supply	208	54
	Intermittent Supply	120	31
	No Electricity	56	15
	Total	384	100

Source: Authors' compilation from primary data

Overall, the demographic profile paints a picture of a diverse student population where factors such as gender, age, education level, residence, and infrastructural conditions shape the landscape of digital literacy and empowerment. The results emphasize that while youth are increasingly exposed to digital technologies, structural barriers such as unequal electricity supply and persistent gender and rural–urban divides could constrain the extent to which digital literacy translates into empowerment. These insights provide a strong foundation for further analysis of how socio-demographic characteristics interact with digital literacy skills to influence youth empowerment.

6.2 Digital Access

Table 2 reveals that a large majority of the respondents (83%) reported having access to a digital device such as a computer, tablet, or smartphone, while 17% did not, suggesting that most students are digitally equipped. Access to the internet was also relatively high, with 75% indicating availability at home or nearby, although one in four respondents (25%) still lacked such access, reflecting a digital divide. Personal ownership of smartphones was common, with 80% of the student's reporting possession of their own device, reinforcing the smartphone's role as the primary digital tool among youth. Social media usage was also widespread, with 84% of respondents actively using such platforms, indicating its popularity and potential as a channel for communication and learning. Additionally, 75% of the students reported using digital devices for academic purposes, such as assignments and online classes, while 25% did not, highlighting that although the majority integrate technology into their education, a significant portion remains outside this digital academic engagement. The digital access of the same may be had from Figure 1.

Table 2. Digital Access

Questions/Items	Response options	Frequency	Percentage (%)
Do you have access to a digital device (computer, tablet, or smartphone) ?	Yes	318	83
	No	66	17
	Total	384	100
Do you have access to the internet at home or nearby?	Yes	289	75
	No	95	25
	Total	384	100
Do you have your own personal smartphone?	Yes	308	80
	No	76	20
	Total	384	100
Do you use social media platforms?	Yes	323	84
	No	61	16
	Total	384	100
Do you use digital devices for academic purposes (assignments, online classes, etc	Yes	287	75
	No	97	25
	Total	384	100

Source: Authors' compilation from primary data

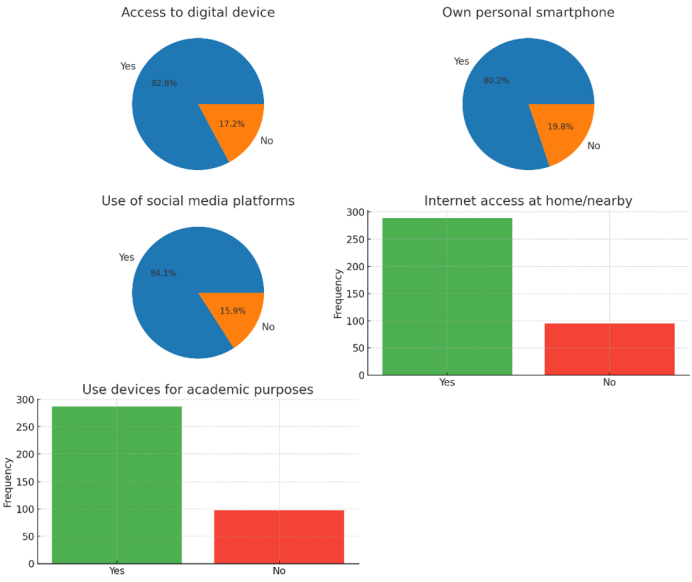

Fig. 1. Digital Access

6.3 Digital Literacy Skills

Table 3 highlights that students possess uneven levels of digital competency. A large proportion (82%) can effectively search for information online, suggesting that most are comfortable navigating the internet for academic or personal needs. Similarly, 76% of respondents are able to fill out online forms such as applications or registrations, reflecting their familiarity with routine digital interactions. However, other areas reveal noticeable gaps. Only 68% of students reported being able to send and receive emails with attachments, leaving nearly one-third without this basic communication skill. File management skills, such as copying, renaming, or deleting files on computers

or smartphones, were present in 64% of respondents, while 36% lacked such proficiency. The pictorial interpretation of digital literacy skills is presented in Figure 2.

The findings also indicate limited technical and safety-related skills. Just over half (51%) of the students could use spreadsheet software like Excel or Google Sheets, while 49% lacked this ability, pointing to weaknesses in data handling. Similarly, only 53% knew how to adjust privacy settings on social media, while 47% were unaware of how to safeguard their digital presence, exposing them to potential online risks.

Table 3. Digital Literacy Skills

Questions/Items	Response options	Frequency	Percentage (%)
Can you search for information online effectively?	Yes	315	82
	No	69	18
	Total	384	100
Can you send and receive emails with attachments?	Yes	264	68
	No	120	32
	Total	384	100
Can you manage files on a computer or smartphone (copy, paste, rename, delete) ?	Yes	245	64
	No	139	36
	Total	384	100
Can you fill out online forms (applications, registrations) ?	Yes	290	76
	No	94	24
	Total	384	100
Can you use spreadsheet software (Excel, google sheets) for basic tasks?	Yes	197	51
	No	187	49
	Total	384	100
Do you know how to adjust privacy settings on social media accounts?	Yes	203	53
	No	181	47
	Total	384	100

Source: Authors' compilation from primary data

Overall, while most students demonstrate competence in basic digital tasks, there remain substantial gaps in essential skills such as email usage, file management, spreadsheet handling, and digital privacy management—areas that are increasingly important for academic success, employability, and online safety.

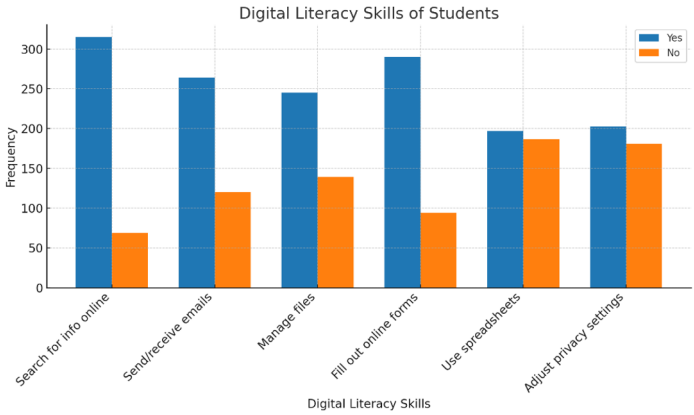

Fig. 2. Digital Literacy Skills

6.4 Availability and Use of Technology in Educational Institutions

Table 4 indicates a clear gap in the availability and use of technology within educational institutions in the Garo Hills of Meghalaya. Less than half of the respondents (42%) reported that their institutions provide access to digital devices such as computers, tablets, or smart classrooms, while a majority (58%) do not have such facilities. Similarly, internet connectivity within institutions appears limited, with only 36% of students reporting access, compared to 64% who stated there is no internet available.

Table 4. Availability and Use of Technology in Educational Institutions

Questions/Items	Response options	Frequency	Percentage (%)
Does your educational institution provide access to digital devices (computers, tablets, smart classrooms)?	Yes	161	42
	No	223	58
	Total	384	100
Is internet connectivity available in your institution?	Yes	138	36
	No	246	64
	Total	384	100
Do your teachers use digital tools (PowerPoint, smartboards, online platforms) for teaching?	Yes	163	42
	No	221	58
	Total	384	100
Have you attended online classes organized by your institution?	Yes	165	33
	No	219	67
	Total	384	100
Do you use institutional digital resources (library databases, e-learning portals, etc)?	Yes	73	19
	No	311	81
	Total	384	100

Source: Authors' compilation from primary data

In terms of teaching practices, only 42% of the respondents indicated that their teachers use digital tools like PowerPoint, smartboards, or online platforms for instructional purposes, whereas 58% reported that such practices are absent. This limited integration of technology is further reflected in the fact that just one-third of the students (33%) had attended online classes organized by their institutions, with the majority (67%) having no such experience. Access to institutional digital resources such as library databases or e-learning portals is particularly poor, with only 19% of respondents using them, while a striking 81% reported no access to these resources. Figure 3 presents the availability and use of technology in educational institutions.

Overall, the results suggest that while some institutions are adopting digital devices and tools, a significant majority of students still lack access to technology-enabled learning environments. This highlights major infrastructural and pedagogical challenges that need to be addressed to promote digital literacy and, consequently, youth empowerment in the region.

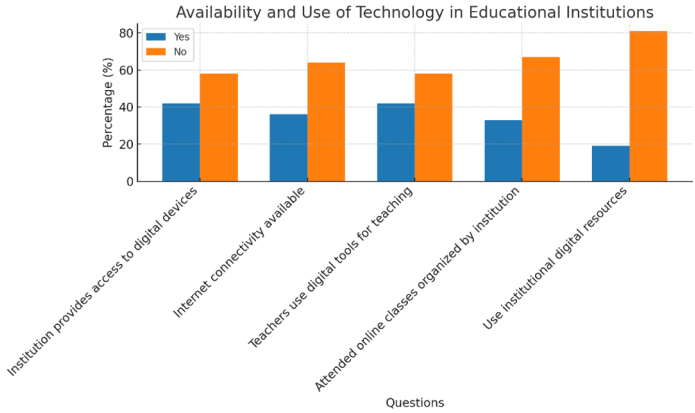

Fig. 3. Availability and Use of Technology in Educational Institutions

6.5 Digital Literacy and Youth Empowerment

The results in Table 5 highlight a strong positive association between digital literacy and various aspects of youth empowerment in the Garo Hills of Meghalaya. A large majority of respondents (85%) reported that digital skills have directly improved their academic performance, showing the critical role of digital competencies in enhancing learning outcomes. Similarly, 63% of students indicated that they actively use digital platforms to search for scholarships, internships, and job opportunities, reflecting how digital literacy expands career-related opportunities.

Table 5. Digital Literacy and Youth Empowerment

Questions/Items	Response options	Frequency	Percentage (%)
Have digital skills helped you in improving your academic performance?	Yes	327	85
	No	57	15
	Total	384	100
Have you used digital platforms to search for scholarships, internships, or job opportunities?	Yes	245	63
	No	139	37
	Total	384	100
Do you use digital tools to connect with peers, teachers, or professional networks?	Yes	213	55
	No	171	45
	Total	384	100
Do you feel that digital literacy has improved your confidence in social interactions?	Yes	316	82
	No	68	18
	Total	384	100
Do you think digital literacy can help in reducing unemployment among youth?	Yes	341	89
	No	43	11
	Total	384	100
In your opinion, has digital literacy increased opportunities for youth empowerment in your community?	Yes	283	73
	No	101	27
	Total	384	100

Source: Authors' compilation from primary data

On the social dimension, more than half (55%) reported using digital tools to connect with peers, teachers, or professional networks, suggesting that digital literacy facilitates knowledge sharing and professional engagement. Additionally, 82% of respondents acknowledged that digital skills boosted their confidence in social interactions,

underlining the transformative role of digital competencies in building self-assurance and communication capacity. The analysis of digital literacy and youth empowerment is also presented in Figure 4 in graphic form.

Economic empowerment also emerged as a strong theme: 89% of participants believed digital literacy could help reduce youth unemployment, while 73% agreed that it has increased opportunities for youth empowerment within their communities. Collectively, these findings demonstrate that digital literacy is not only enhancing academic and professional prospects but also shaping social confidence and economic opportunities, thereby serving as a powerful driver of youth empowerment in the region.

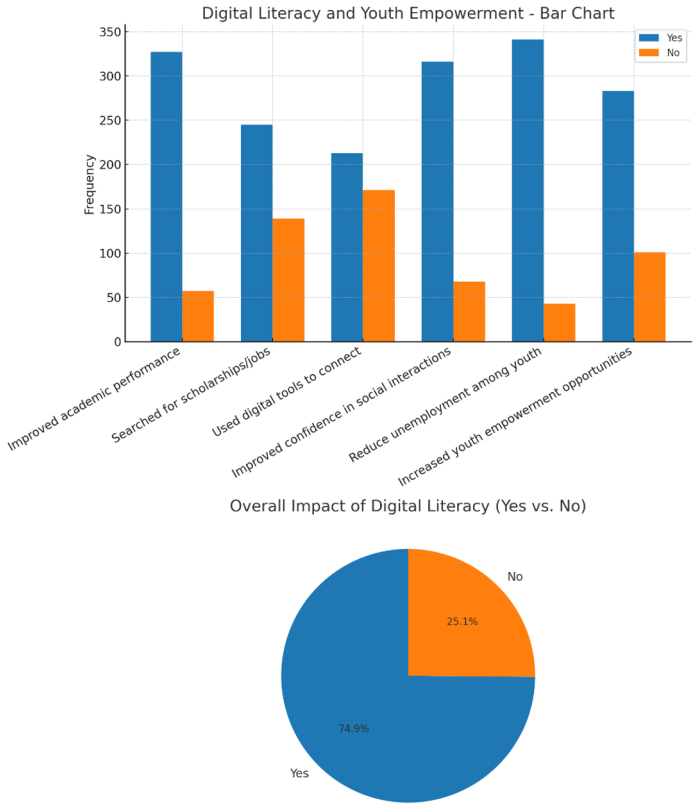

Fig. 4. Digital Literacy and Youth Empowerment

7 Conclusion and Recommendation

The findings of the study indicate that while a majority of youth in the Garo Hills of Meghalaya have access to digital devices and demonstrate basic digital skills, significant barriers persist that limit the full realization of

digital literacy as a tool for empowerment. Unequal access to electricity, limited internet connectivity, and inadequate technological infrastructure within educational institutions continue to reinforce the digital divide, particularly between rural and urban areas, as well as between genders. Although most students are confident in using digital devices for online searches, form-filling, and social media, substantial skill gaps remain in email communication, file management, spreadsheet handling, and digital safety practices—all of which are essential for higher academic performance, employability, and online protection. Despite these challenges, the evidence strongly supports that digital literacy has a transformative impact on academic success, social confidence, career advancement, and economic opportunities, positioning it as a powerful driver of youth empowerment in the region.

To maximize these benefits, it is recommended that interventions prioritize both infrastructural improvements and capacity-building initiatives. Ensuring reliable electricity and affordable internet access, particularly in rural and underserved areas, is fundamental to creating an enabling environment for digital participation. Educational institutions should be strengthened through the provision of digital devices, e-learning platforms, and smart classroom facilities, alongside systematic teacher training programs that promote the effective integration of technology into pedagogy. Furthermore, comprehensive digital literacy curricula should be embedded across secondary, vocational, and higher education, with an emphasis on advanced digital competencies, employability skills, and safe online practices. Special consideration must be given to addressing the gender gap and rural–urban disparities through inclusive policies and targeted initiatives that empower marginalized groups, especially young women and rural learners. Finally, sustainable collaboration among government agencies, educational institutions, civil society, and private stakeholders is essential to build a robust ecosystem where digital literacy not only bridges socio-economic divides but also serves as a long-term foundation for youth empowerment, social equity, and sustainable community development in the region.

References

1. ASER Centre. Digital readiness of India's youth [Evidence briefs]. ASER Centre. https://asercentre.org (2023).
2. Bandura, A. Self-efficacy: The exercise of control. Freeman (1997).
3. Basu, A., & Mukhopadhyay, S. Community ICT centres and women's empowerment: Evidence from rural West Bengal. Indian Journal of Development Studies, 14(3), 210–225. (2022).
4. Bhagat, R., Verma, P., & Patil, S. Digital skill gaps among tribal high school students in Maharashtra. Journal of Tribal Education, 6(1), 135–150. (2021).
5. Borah, R. ICT in education: Opportunities and challenges in rural India. Indian Journal of Education, 44(2), 34–49. (2019).
6. Chaifry. Meghalaya's educational journey: Tribal innovations, reforms and terrain-driven inequities (1940–2020). https://www.chaifry.org (2025).
7. Gilster, P. Digital literacy. Wiley. New York (1997).
8. Government of India. DIKSHA – National Digital Infrastructure for School Education. https://diksha.gov.in (2023).
9. Hargittai, E. Digital natives? Variation in Internet skills and uses among members of the "next generation." Sociological Inquiry, 80(1), 92–113. https://doi.org/10.1111/j.1475-682X.2009.00317.x (2010).
10. Helsper, E. J., & Eynon, R. Distinct skill pathways to digital engagement. European Journal of Communication, 28(6), 696–713. https://doi.org/10.1177/0267323113499113 (2013).
11. http.//.www.India.gov.in, (2021) [accessed on 5th July, 2025)
12. India Today NE. Meghalaya: 925 students receive digital learning tablets in South West Garo Hills. https://www.indiatodayne.in (2025, April 4).
13. India.gov.in. Pradhan Mantri Gramin Digital Saksharta Abhiyan. https://www.india.gov.in (2021).
14. Kumar, S., & Muthuswamy, K. Tablet-based math instruction in rural Tamil Nadu: A cluster-randomized trial. Indian Journal of Educational Technology, 18(4), 320–337. (2021).
15. Ng, W. Can we teach digital natives' digital literacy? Computers & Education, 59(3), 1065–1078. https://doi.org/10.1016/j.compedu.2012.04.016. (2012).
16. Pradhan, A., Nayak, J., & Das, S. Evaluating the usage of school-provided tablets in remote districts of Odisha. Education and Technology Review, 12(2), 95–107. (2020).
17. Raju, A., & Chopra, N. Effectiveness of computer lab sessions on digital competence in rural Rajasthan schools. Educational Research in India, 22(1), 45–60 (2023).
18. Ramesh, B., Narayan, G., & Sundar, R. Digital marketing training and enterprise outcomes among rural youth in Karnataka. Journal of Rural Entrepreneurship, 3(2), 58–73. (2021).

19. Singh, D., & Jain, R. Enhancing adult literacy via mobile blended learning: Evidence from Bihar. International Journal of Adult Education, 11(1), 27–43. (2022).
20. Tripathi, P., Sharma, V., & Singh, R. Evaluating digital literacy interventions in rural India: Impacts on employment and empowerment. BPAS Journal of Library Science, 46(1), 55–72. (2024).
21. UNESCO. A global framework of reference on digital literacy skills for indicator 4.4.2. Paris: United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000265403 (2018).
22. Van Dijk, J. The deepening divide: Inequality in the information society. Sage. New Delhi (2005).
23. Van Dijk, J. The digital divide. Polity Press. Massachusetts (2020).
24. Verma, P., & Singh, K. Local language mobile learning content and adolescent cognitive gains in Madhya Pradesh. Journal of Community-based Education, 5(1), 72–85. (2022).
25. Warschauer, M. Technology and social inclusion: Rethinking the digital divide. MIT Press, Cambridge. (2003).
26. World Bank. World development report 2016: Digital dividends. World Bank. https://doi.org/10.1596/978-1-4648-0671-1. (2016).