

Contribution of Digital Technology for Quality Education in Rural Areas and in achieving SDGs (4,5,8,17)

Dr. Asha Singh^{1*}, Ahmad Pervez², Kinjal Sanghavi¹, Akanksha Rathore³, Preeti Kumari³, Sangeeta Choudhary⁴, Divya Bharathi J¹, and Jyoti Pareek¹

¹Department of Commerce and Management, Nirwan University, Jaipur, Rajasthan, India

Email: ashanikitha@gmail.com; *Corresponding Author; Orcid ID: 0000-0002-4184-6593

²Biocontrol Laboratory, Department of Zoology, Pt. Lalit Mohan Sharma Campus, Sri Dev Suman Uttarakhand University, Rishikesh, Uttarakhand, India;

Email: ahmadpervez@yahoo.com; Orcid ID: 0000-0003-3224-4782

³Department of Commerce and Management, Jayoti Vidyapeeth University, Jaipur, Rajasthan, India.

⁴Department of Computer Science, Jayoti Vidyapeeth University, Jaipur, Rajasthan, India.

Abstract

The quality, accessibility, and inclusivity of education in rural areas have all improved; thanks to digital technology, which has also made a substantial contribution to the UN Sustainable Development Goals (SDGs). This study examines the impact of digital tools, including mobile applications, virtual classrooms, digital libraries, online learning platforms, and ICT-enabled teacher training, on enhancing educational outcomes in underserved and rural regions. Digital education initiatives support gender equality (SDG 5) by empowering rural women and girls through increased digital literacy and educational participation, while also promoting equitable access to high-quality education and lifelong learning (SDG 4) by lowering geographic barriers, addressing teacher shortages, and enabling personalized and flexible learning opportunities. Additionally, digital education indirectly supports SDG 6 on clean water and sanitation by promoting knowledge and skill development in areas such as health, sanitation, and water resource management. In line with SDG 8, the incorporation of digital skills and vocational e-learning platforms improves rural youth employability, entrepreneurship, and chances for decent work. Furthermore, multi-stakeholder cooperation among governments, educational institutions, commercial sector players, and civil society is essential for the effective deployment of digital education in rural areas, which aligns with SDG 17 on partnerships for sustainable development. According to the study's findings, digital technology may significantly improve rural education systems and hasten the achievement of several interrelated SDGs when it is backed by inclusive policies, infrastructure development, and capacity-building programs.

Keyword: Quality education, Gender equality, Decent work and economic growth, Partnerships for the goals and Digital technology

1. INTRODUCTION

The rural areas benefit from digital technology, which bridges the gap between local, resource-constrained education and global potential. Technology offers more than just "screens" by supporting certain Sustainable Development Goals (SDGs); it also creates the framework for social and economic mobility (Singh, 2026a; Singh A. et al., 2026). The ubiquitous presence of the digital has left an indelible stamp on modern society, and its pervasive effect has been fostering a significant reconfiguration of human interactions and social structures, a phenomenon that has been extensively documented in the literature (e.g., Castells, 2015; Souza et al., 2023). The advent of artificial intelligence has created ease in various agricultural, scientific, management and pharmaceutical fields (Pervez and Singh, 2026; Nautiyal and Pervez, 2026; Saifi et al., 2026; Singh, 2026b; Singh R. et al., 2026). However, the gradual disintegration of the distinction that historically divided online and offline realities, leading to an increasingly integrated merger of these two realms, is especially indicative of this profound social reconfiguration. The human experience is profoundly and multidimensionally impacted by this process of hybridization of existence, which directly affects how individuals and groups construct their identities as well as how reality is seen (Schlemmer et al., 2020; Schlemmer & Moreira, 2020; Yun, 2023).

As the main institution for socialization and skill development, education must critically and thoughtfully adapt its core functions—curriculum, pedagogy, and assessment—to these new emerging realities in light of this systemic and comprehensive reconfiguration, which gives rise to new and fundamental demands that are unmistakably reflected in educational systems (Floridi, 2014, 2015; Castells, 2015; Redecker, 2017; Schlemmer & Moreira, 2020; Sá et al., 2021). In a setting where innovation is seen as a basic and inevitable necessity for social cohesion and advancement, failing to make such a systemic adjustment carries the significant risk of creating a significant gap between educational outcomes and societal and individual needs. This mismatch could result in training the people who are not sufficiently prepared for today's challenges and exacerbate already-existing social inequalities (Sadjadi, 2023).

Therefore, rather than being just portrayed as a desirable alternative, educational innovation needs to be confirmed as an urgent necessity with growing urgency. Education systems' inaction or stagnation is a decision with unfavourable and detrimental effects rather than a neutral position (Sailer et al., 2021a). In addition to being a lost chance to improve education, continuing to use outdated models actively exacerbates complex social issues like the workforce's inadequacy in response to changing market demands and the widening of social gaps and inequalities (van Dijk, 2020; Sá et al., 2021).

This scenario challenges a vision of purely technological determinism and necessitates a profound reconfiguration of competencies, pedagogies, and assessment methods. It describes educational innovation in the digital age as a complex interaction between pedagogical designs and the vast technological potential (Sailer et al., 2021a; Redecker, 2017; Moreira et al., 2020). For this reason, it is essential to concentrate on helping students and teachers improve their digital, technological, and—most importantly—critical literacies (Martin, 2006). Since critical literacy has been demonstrated to be the cornerstone of conscious participation in the infosphere, this endeavor aims to demystify the oversimplified concept of "digital natives" (Bennett et al., 2008) and emphasize the necessity of individualized and ongoing training pathways (Loureiro et al., 2022). In the end, educators' critical, reflective, and reasoned intentionality—whose pedagogical agency is crucial—determines how effective technology is in the classroom, not the instrument itself (Moreira et al., 2020; Sailer et al., 2021a, 2021b). This shift involves the educator's role evolving from a vertical transmission model (Tonucci, 1993) to a more active and facilitative approach (Salmon, 2002). Several authors have examined this shift (Ahlquist, 2014; Ott & Hoelscher, 2023; Redecker, 2017).

This study intends to conduct a thorough analysis of the various and interrelated facets of this pedagogical reconfiguration, focusing on the nature of digital societies, the demand for new literacies and skills, the intricate structure of learning ecosystems, the best digital assessment techniques, and the significant obstacles that come with this unavoidable shift. It will conclude with the presentation of findings and suggestions for future research directions and educational practice. This article employs a literature review methodology that integrates the findings of current, pertinent research with theoretical frameworks to achieve this goal. With this method, we can offer a thorough, solid, and well-supported analysis of educational innovation in the digital era.

Digital Technology's Contribution to Raising Education Quality

Through its transformation of teaching methods, learning environments, and institutional governance, digital technology has emerged as a key tool in redefining the quality of education. Access, efficacy, equality, and relevance of learning are all improved by the incorporation of information and communication technologies (ICTs) into educational systems, especially in underserved and rural areas.

1. Improving Quality Learning Resource Access- No matter where they are in the world, students may now access top-notch educational materials thanks to digital technology. Students are exposed to expert information, standardized curricula, and updated learning materials through online platforms, digital libraries, Massive Open Online Courses (MOOCs), and open educational resources (OERs). Digital content guarantees learning continuity and equity in rural areas, where textbooks and libraries are frequently scarce.

2. Enhancing Instructional Methods- Learner-centered and interactive education is encouraged by technology-supported pedagogy. Videos, animations, simulations, virtual labs, and instructional games are examples of multimedia techniques that improve conceptual clarity and engagement. Digital whiteboards and smart classrooms let students learn visually, which helps them comprehend difficult ideas in the social sciences, sciences, and arithmetic.

3. Encouraging Customized and Flexible Education- Digital platforms use learning analytics and artificial intelligence to customize instructional materials based on the needs, skills, and speed of each individual student. Personalized learning paths enhance academic results by assisting in the identification of learning gaps and offering focused interventions. Students with a variety of learning styles and first-generation learners particularly benefit from this method.

4. Improving Professional Development and Teacher Effectiveness- Through ongoing professional development, digital technology is essential to teachers' empowerment. Peer learning communities, digital certification courses, webinars, and online training programs all improve teachers' topic knowledge and pedagogical abilities. Teachers can implement creative and inclusive teaching strategies when they have access to digital teaching resources and international best practices.

5. Improving Mechanisms for Assessment and Evaluation- Assessment procedures are more accurate, transparent, and efficient when using technology-enabled solutions. Real-time feedback, formative evaluations, automatic grading systems, and online tests all aid in monitoring student development and learning objectives. Teachers and administrators can make well-informed academic and policy decisions with the help of data-driven insights.

- 6. Promoting Equity and Inclusivity in Education-** Because it can accommodate a variety of learner demands, digital technology promotes inclusive education. Screen readers, speech-to-text software, captioning, and adaptive interfaces are examples of assistive technology that enable students with impairments to engage in the learning process. Additionally, by lowering sociocultural barriers to education, digital education projects empower marginalized populations, including girls.
- 7. Promoting Lifelong Learning and Skill Development-** Digital literacy, critical thinking, problem-solving, and teamwork are among the 21st-century abilities that are fostered via digital education. Learners' employability and entrepreneurship are improved via online vocational courses, skill-based training platforms, and certification programs. Digital learning models that are flexible and self-paced make opportunities for lifelong learning available.
- 8. Enhancing Governance and Institutional Efficiency-** Digital management systems help educational institutions by streamlining administrative tasks like communication, academic records, admissions, and attendance. Effective governance and quality assurance in education are facilitated by Learning Management Systems (LMS), which improve cooperation between administrators, teachers, and students.
- 9. Fostering International and Collaborative Education-** Collaboration is made easier by digital platforms outside of traditional classroom settings. International academic networks, discussion boards, and virtual classrooms encourage peer learning, intercultural communication, and cooperative research. Students' perceptions are widened, and they are better equipped to be global citizens as a result of this experience.
- 10. Ensuring Education Continues During Emergencies-** When there are disturbances like pandemics, natural catastrophes, or conflicts, digital technology makes sure that learning continues. Digital communication tools and remote learning platforms allow for continuous education, which is especially advantageous for vulnerable and rural people.

2. LITERATURE REVIEW

Numerous studies demonstrate how ICT integration and digital tools increase access to content, promote interactive learning, and aid-in teacher development, all of which raise educational standards. Multimedia materials, online courses, and virtual classrooms, for instance, have been shown to improve conceptual understanding, increase student engagement, and augment the limited in-school instructional resources available in remote areas.

1. **Rural Education's Digital Divide:** In comparison to their metropolitan counterparts, rural education systems are sometimes distinguished by a notable discrepancy in access to technology. Schools in rural locations are frequently hampered by inadequate infrastructure and insufficient connections to basic technical resources, despite the fact that metropolitan schools are adopting digital tools at a fairly rapid pace. Because teachers in rural areas may not have access to the latest technical advancements or the know-how to incorporate them into the classroom, technological disparity has a substantial negative impact on education (Ofosu-Asare, 2024). The lack of infrastructure and resources extends beyond instructors' inability to access professional development opportunities in rural areas, such as technology. Since they will need to adapt to the evolving educational landscape, teachers who lack the necessary training and direction will not implement Technological Pedagogical Content Knowledge into their practices as effectively as others (Aslan et al., 2025). Furthermore, there is little exposure to effective digital literacy practices, which implies that teachers' digital literacy prevents them from experimenting with and utilizing cutting-edge teaching strategies (Harmadi et al., 2025). Accordingly, the digital divide restricts not just access to technology but also the development of pedagogical and subject expertise regarding its use in the classroom. Because rural educators continue to face these challenges, closing the digital gap is crucial to providing all kids with equal access to high-quality education (Ikpeze, 2018).

Rural classrooms lack modern devices and internet connection, which makes it difficult for teachers to successfully incorporate technology into their lessons and denies pupils exposure to digital literacy (Zhao, 2024). This indicates that rural kids are lagging in acquiring the digital literacy, problem-solving, and collaborative abilities necessary for success in the new millennium (Amelia et al., 2025).

2. **Gaps in Pedagogy and Content Knowledge:** The lack of resources and professional development in rural areas frequently makes it difficult for instructors to use technology and contemporary pedagogical approaches. Scholars have found that teachers in rural schools frequently lack access to training that may help them update their teaching methods and incorporate technology into their lessons (Amelia et al., 2025). Inadequate professional development will force educators to stick to conventional teaching methods, which may not make the most of the digital resources at their disposal. Aslan et al. (2025) claimed that although modern pedagogy promotes student-centered activities and interaction in the classroom, these approaches are difficult to implement without the support of technology or professional training.

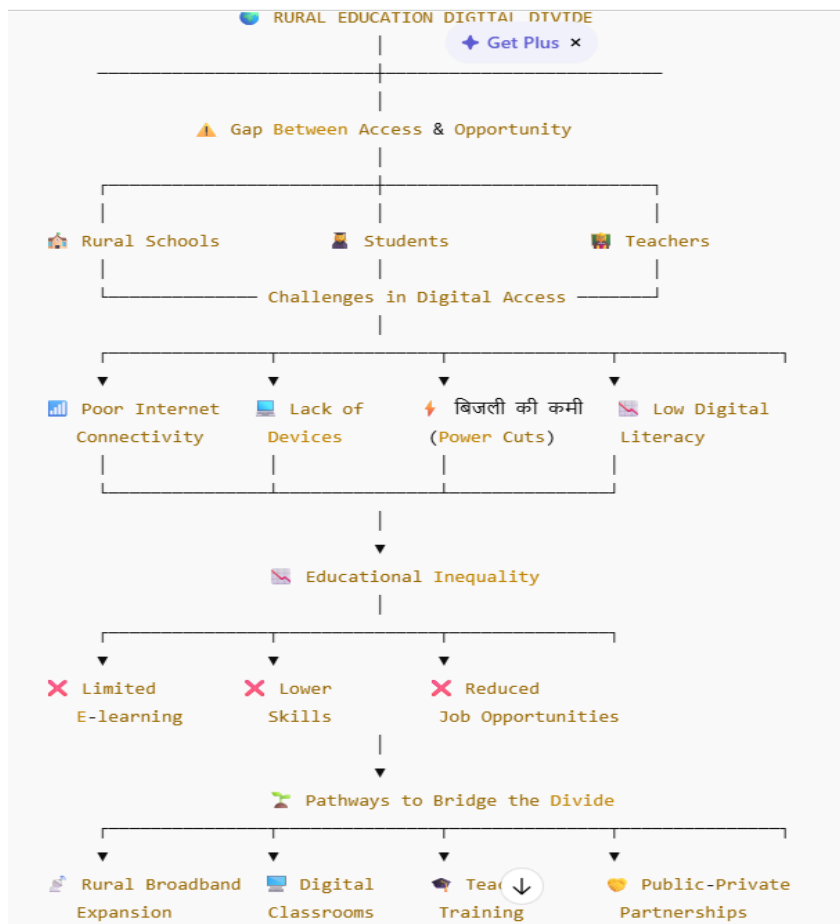


Figure-1 Rural Education's Digital Divide

Along with pedagogical difficulties, rural educators also face difficulties combining their technological expertise with subject-matter expertise to provide engaging and significant lessons. According to Harmadi et al. (2025), teachers must possess both subject-matter expertise and the ability to organize technology in a way that facilitates learning of that subject. However, the majority of teachers in rural areas lack the necessary abilities to satisfy this integration. However, Zhao (2024) asserts that without a solid understanding of what they have to teach and what technology resources they may use to teach it, they are unable to create educational programs that are engaging and packed with content for students. According to Molaoa (2024), teachers in rural areas, particularly those working in environments with limited resources, find it difficult to modify their teaching methods in order to use as many digital resources as possible, depriving students of opportunities to engage with the content in an interactive way.

3. **Obstacles to Career Advancement and Development:** Teachers' capacity to adjust to the demands of contemporary education is greatly impacted by the lack of professional development options in rural areas, especially when it comes to the incorporation of technology. Furthermore, according to Ofosu-Asare (2024), trainings that focus on integrating technology and innovative pedagogical techniques are not always available to rural instructors. Teachers are now ill-prepared to bridge the digital gap and incorporate technology into their lessons as a result of this. Lack of continuous professional development puts rural educators at a disadvantage compared to urban educators, who frequently have access to more and a wider variety of training opportunities (Aslan et al., 2025). Furthermore, as Gemella (2024) points out, a lack of professional development may also jeopardize teachers' ability to acquire digital literacy skills since they will be unable to fully employ technology to improve student learning.

4. **Institution in Digital Worlds :** A thorough examination of its surroundings is essential for gaining a comprehensive grasp of the modern educational situation (Bronfenbrenner, 1987). The term "digital societies" describes collectivities that are significantly influenced by ongoing information flows and digital infrastructures (Castells, 2015; Schlemmer & Moreira, 2020). Hyperconnectivity, the widespread digitization of daily life, and a noticeable blurring of the lines that once divided the actual and virtual worlds are some of the traits that set these communities apart. The human experience, identity formation, social interaction, and even the perception of reality are all significantly impacted by this phenomenon (Floridi, 2014, 2021; Schlemmer et al., 2020). As a result, new and intricate ethical conundrums like algorithmic bias and data privacy are created (Mhlongo et al., 2023; Yun, 2023).

SDG 5: Gender Equality and Digital Education: Numerous studies highlight how digital technology can assist in closing the gender gap in rural education by giving females access to digital literacy programs, learning materials, and community-based learning platforms. According to research on digital literacy programs, focusing on rural women boosts their involvement in economic and educational endeavors, which is consistent with SDG 5's emphasis on gender equality and empowerment. Since learning is no longer limited to physical locations or certain times, but rather has the potential to become omnipresent and continuous, this paradigm has broad and transformative educational implications (Sangrà, 2022). As a result, formal education's traditional role as the primary source of knowledge is being reconfigured to fulfill the mission of giving students the skills they need to manage, interpret, and interact ethically with the constant flow of information (Redecker, 2017; Moreira et al., 2020). The significance of skills like critical digital literacy, self-regulation in online settings, and ethical decision-making is highlighted by this new reality. These abilities are becoming equally, if not more, important than subject-specific knowledge (Williams, 2022). As a result, learning is changing from a discrete event to a process that is fully integrated into life (Dias Trindade, 2020). This challenges formal education to place more emphasis on developing "metaskills" like critical thinking, adaptability, and learning to learn rather than imparting a fixed body of knowledge. These skills prepare people for a life of continuous learning in a hybrid reality (Sá et al., 2021), where the ability to define oneself as a knowledge producer and critic becomes a primary goal (Nieminen et al., 2024).

Movements that support more thoughtful technology use demonstrate that, despite the widespread use of digital devices, there is a growing tension. This underscores the importance of developing not only digital skills but also "digital wellbeing" and relationship management skills (Redecker, 2017; Meyerhofer-Parra & González-Martínez, 2024). According to Yun (2023), this has made topics like privacy, the freedom to unplug, and the effects of hyperconnectivity on social relationships and mental health very urgent and unavoidable.

5. **Essential Literacies and Skills for the Digital Age :** To successfully participate in today's complex and interconnected environments, educators and students must acquire a strong set of competencies and literacies as a result of the shift to modern digital societies (Redecker, 2017; Dias-Trindade & Gomes Ferreira, 2020; Sá et al., 2021).

SDG 8: Economic Empowerment, and Digital Skills: It is often known that digital technology improves economic growth and employability. Enhancing the employment prospects and entrepreneurial skills of rural adolescents has been facilitated by online vocational training, e-learning skill programs, and access to digital marketplaces. According to research, having access to training in digital skills helps rural populations engage in the digital economy, which is consistent with SDG 8's objectives of inclusive growth and decent work. The ability to integrate technologies deliberately, critically, and effectively into all facets of professional practice is what constitutes teachers' digital competence in this context, which goes beyond mastery of a particular instrument (Sailer et al., 2021a). According to this assumption, teachers must be able to not only plan and carry out the use of digital resources in the different stages of a learning activity (Lohr et al., 2021), but also learn how to develop, assess, and manage them ethically and responsibly concerning artificial intelligence tools (Mhlongo et al., 2023; Joshi et al., 2026). As a result, the role of a teacher with strong digital skills changes from being a simple information provider to one of a mentor and advisor who creates enriched learning pathways, offers students individualized support, and actively encourages group and self-regulated learning activities (Salmon, 2002; Redecker, 2017). Continuous practical experience, methodical reflection, and a dedication to lifelong professional growth are factors that contribute to the gradual development of these complex competencies (Fissore et al., 2020). Institutional assistance must be continuous and differentiated rather than restricted to one-time, generalized training practices that prove insufficient, as educators begin their professions with wildly disparate levels of competence and rates of advancement (Loureiro et al., 2021). It is therefore imperative that educational institutions work to establish professional development ecosystems that provide individualized pathways, continuous assistance, and sharing opportunities, like coaching programs or the encouragement of communities of practice (Dias-Trindade & Gomes Ferreira, 2020; Economou et al., 2023; Palacios-Rodríguez et al., 2023).

Numerous national and international studies that highlight the ongoing need to improve teachers' digital abilities support the need for this training (Fissore et al., 2020; Loureiro et al., 2021; Andaluz-Delgado et al., 2023). This worldwide trend is entirely consistent with Portuguese reality, especially the unique circumstances of the Autonomous Region of the Azores, where a sizable portion of instructors still lack specialized training in this field (Loureiro et al., 2024). The need for training to go beyond the simple instrumental use of tools and instead concentrate on creating a specific "digital didactic" tailored to each teaching context is further highlighted by the fact that teachers' digital proficiency tends to vary significantly depending on the subject area taught (Sailer et al., 2021a; Vieira et al., 2023). Thus, a clear institutional and political responsibility for developing and providing adaptable, individualized, and widely accessible training pathways must be combined with teachers' personal accountability for their own training (Dias-Trindade & Gomes Ferreira, 2020; Palacios-Rodríguez et al., 2023). Three essential literacies, digital literacy, technological literacy, and critical literacy, emerge within this expansive conceptual framework (Williams, 2022). Martin (2006) defines technological literacy as the ability to use digital resources for well-defined purposes beyond merely instrumental or mechanical use, while digital literacy is the ability to use digital resources to access, manage, evaluate, and create knowledge effectively. Critical literacy, on the other hand, assumes a genuinely foundational role by empowering people to examine the deluge of information spread by the media through an informed, critical "lens" that is cognizant of the underlying mechanisms of bias and power (Williams, 2022).

6. **Innovative digital learning environments and ecosystems :** In the digital age, education is structured as a "digital education ecosystem," which is far more intricate and all-encompassing than the mere employment of discrete technology instruments (Moreira, online).

Partnerships for the Goals : SDG 17: Three essential components make up this dynamic, interactive system: resources (hardware, platforms, and content); actors (students, instructors, and administrators); and institutional policies and educational approaches. According to Mhlongo et al. (2023) and Sailer et al. (2021a), these components work together to establish and maintain adaptable, customized learning environments. This viewpoint, which draws inspiration from Bronfenbrenner's (1987) ecological models of human development, views digital education as a complex network of technological elements, learning platforms, content resources, human actors, institutional policies, and pedagogical strategies that interact dynamically to produce rich, adaptable, and flexible learning environments (Dias Trindade, 2020; Mhlongo et al., 2023).



Figure 2. Economic Empowerment, and Digital Skills

Take, for instance, a secondary school project-based learning program where students research a regional environmental concern. In an effective digital environment, they may access scientific resources through the school's digital library and manage the project using collaborative online platforms like Google Workspace or Microsoft Teams.

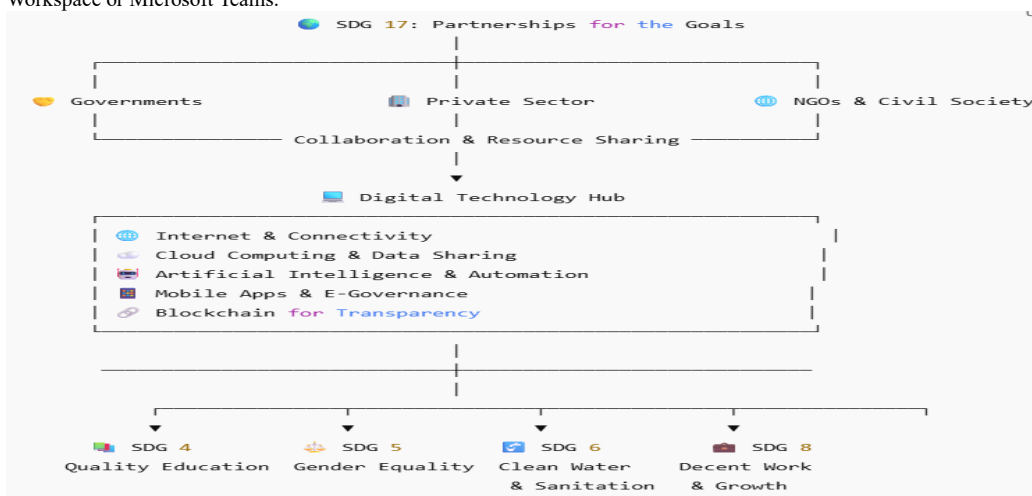


Figure 3. Partnerships for the Goals : SDG 17: Nieminen et al. (2024) asserted that it is crucial to seamlessly integrate educational advice, digital resources, and authentic learning objectives. Such an ecosystem's efficacy stems specifically from its capacity to articulate many contexts logically and cooperatively, adhering to a logic of hybridization that seamlessly combines digital and physical learning spaces (Sangrà, 2022). According to this systemic approach, any digital ecosystem's ability to succeed mostly rests on how well its essential components—resources, teachers, and students—interact with one another (Moreira, online; Schlemmer & Moreira, 2020). A new technology will inevitably be underutilized or fail if it is implemented without appropriate teacher training (Loureiro et al., 2021), without careful consideration of the needs and contexts of the students (Guzmán-Simón et al., 2017), or without the backing of clear and supportive institutional policies (Yun, 2023). The pedagogical dimension refers to the ability of teachers to design and guarantee the quality of learning experiences; the organizational dimension includes leadership and change management; and the technological dimension includes infrastructure, resources, and technical support. These three interdependent dimensions must be cohesively articulated for technological implementation to be of high quality (Sailer et al., 2021a). In the end, developing meaningful and captivating "e-activities" is essential to creating digital learning experiences that are actually effective (Barros, 2023; Campos, 2023). To ensure that technology enhances and supports learning processes rather than just acting as a contemporary prop, Barros (2023) defines an e-activity as any educational activity that uses digital technologies. These activities should be characterized by pedagogical intentionality, personalization, collaboration, and formative assessment, among other principles (Moreira et al., 2020).

Gaps and Research Needs

1. Absence of long-term, rural context-specific research
2. Insufficient connection between the quality of instruction and the availability to technology
3. Lack of evaluation research on the efficacy of training
4. Limited information on the effects of girls' learning
5. Few studies with quantifiable results
6. There is little data to connect digital education to job results.
7. Research incorporating cross-cutting SDG themes is scarce.

Research Objectives

1. Whether rural students with digital exposure actually achieve better workforce outcomes and education.
2. The role of digital education in linking rural learners directly to jobs, internships, or entrepreneurial opportunities.
3. How public-private or cross-sector partnerships function in practice to sustain digital education in rural areas.
4. Whether such partnerships improve the scalability and long-term sustainability of digital programs.

3. RESEARCH METHODOLOGY

Research Design: Exploratory study that draws off earlier reviews of the literature and primary data.

Primary sources: It is collected with an Interview schedule manner and also with a method of interview. The interview schedule consists of questions arranged sequentially. It was created with the purpose of gathering data on the role of digital technology in rural women empowerment, education, innovations - partnerships for economic growth and family development.

Secondary sources, such as Government and Media websites, journals, books, and published

Research is a major source of data.

Interview Schedule and Data Analysis Techniques: The current investigation by conducted by scheduling an interview leading to one-on-one conversations with selected associates using the current tool. The interview schedule framework is semi-formal pertaining to both open and closed-ended questions. The data

was collected on the basis of the Objectives followed by Grounded Theory Approach analysis technique using one on one Interview, Focused Group Discussion and Case study Research. Deductive coding technique for creating codes was used. Using triangulation, a comprehensive understanding of research study was developed.

Sources of Interview Schedule

Table 1 - for Sources of Interview Schedule

Names	Sources	Links
Nagaraji , 2020	http://hdl.handle.net/10603/314542	http://shodhganga.inflibnet.ac.in:8080/jspui/handle/10603/314542
Konwar, 2016	http://hdl.handle.net/10603/83369	http://shodhganga.inflibnet.ac.in:8080/jspui/handle/10603/83369
Rachit, 2017	https://www.ijssar.in/finder.aspx?author=Rachit%20Gupta&title=	
Rani, 2018	http://hdl.handle.net/10603/339958	https://shodhganga.inflibnet.ac.in/handle/10603/339958
(Ahmad et al., 2020)		https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237519
Sukhdeve, 2013		http://shodhganga.inflibnet.ac.in:8080/jspui/handle/10603/185522

4. ANALYSIS

Here, case study research, focus groups, one-on-one interviews, and the grounded theory approach were employed. via in-depth interviews, case studies, and targeted group discussions. In grounded theory analysis, the researcher's personal interpretation of the data is guided by the framework explanation. An information description is the specific researcher's plan for gathering and organizing data, as well as creating a conceptual model that can be compared to fresh discoveries. Grounded theory does not presume that your event, object, or idea has a single meaning. Within the framework of grounded theory, all information is interpreted as data or even materials that fit into the categories that your present research team creates.

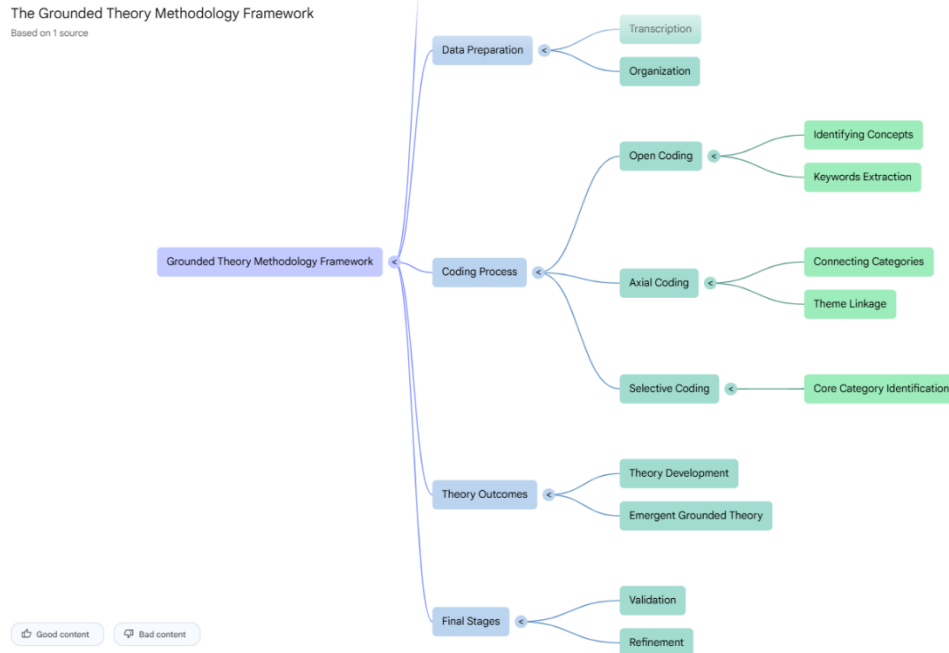


Figure 4. Grounded Theory Approach Flow Research Model Table

Table 2. Research Model Table

	Indicators	Codes	Items
Quality Education(A)	Individual Economic Indicator (A1)	A1a	To launch your own company
		A1b	A rise in savings
		A1c	Constant Business
		A1d	Home construction and repair
		A1e	Loan repayment to unlicensed private moneylenders
	Community Economic Indicator (A2)	A2a	High Product Demand
		A2b	Activities Related to Saving and Lending
		A2c	The Unorganized Sector
		A2d	Discussions about savings are spread throughout routine meetings.
		A2e	Keeping track of the registers for every activity pertaining financial independence
Gender Equality (B)	Individual Social Indicator (B1)	B1a	To improve one's standing in society
		B1b	advised
		B1c	Enhanced Their Way of Life
		B1d	Modifications to the standard of living
		B1e	Improved Healthcare Accessibility
	Community Social Indicator (B2)	B1f	Receive particular acknowledgement in the village and family.
		B1g	Health care
		B1h	Education of children
		B1i	Frequent Gathering
		B2a	Relationships with customers
Decent Work & Economic Growth(C)		B2b	Customer Relationship
		B2c	Campaigns, Public Rallies, and Local and National Gatherings
		B2d	Social Security
		B2e	Members' social bonding through problem-sharing and mutual support
		B2f	Self-sufficient and Family-Friendly Collaborate and Achieve Success
		B2g	Improvements to Sustainable Livelihoods
		B2h	Sustainable Livelihood Enhancements
		C1	Enhanced Self-Belief
	C2	Develop Their Villages Socially and Economically	
	C3	Government Programs for the Development of Livelihoods	
	C4	Completely cognizant of government initiatives	

		C5	Programs for Government Training	
		C6	Enrolled in Health Insurance	
		C7	Content in the mind	
		C8	SHG cooperation and support for members of the same group	
		C9	Improved Prospects	
		C10	able to make their own choices and stand on their own two feet	
		C11	Enhanced audacity	
		C12	Growth in the economy	
Partnerships for the Goals(SDG 17) D	Entrepreneurship Indicator (D1)	D1a	An entrepreneur	
		D1b	Motivation for Her Village Women	
		D1c	Capable of realizing aspirations	
		D1d	helped me define my identity and my worth in the workplace.	
		D1e	Capable of giving other family members a job	
		D1f	Making It Possible for SHG to Raise Household Income	
		D1g	The SHG serves as a useful bank that helps its members market their daily revenue-generating ventures.	
		D1h	allowed them to become more financially independent by using the loan that SHGs supplied.	
		Decision Making Pattern (D2)	D2a	able to make their own choices and stand on their own two feet
			D2b	Enhanced audacity
D2c	Growth in the economy			
D2d	Content in the mind			
D2e	Growth in Business			
D2f	Absent from family obligations			

According to the data, digital technology produces wider social and economic advantages while also greatly enhancing the quality of schooling in rural areas. But only when infrastructure, training, gender inclusion, and partnerships are addressed all at once will the impact be at its greatest. According to the data analysis, digital technology is a significant factor in attaining SDGs 4, 5, 8, and 17 and is a potent enabler of high-quality education in rural areas. A sustainable route toward inclusive rural development is established via digital education through increasing access, empowering girls, promoting employability, and cultivating partnerships. To optimize its impact, it is still necessary to address gender hurdles, computer literacy, and infrastructure shortages.

SDG Goal	Specific Digital Tool	Impact on Rural Community	Analytical Insight
SDG 4: Quality Education	AI Learning Apps / MOOCs	Access to world-class curriculum in remote areas	AI-driven platforms and MOOCs reduce geographic barriers, enabling rural learners to access high-quality content, personalized learning, and skill-based courses, improving learning outcomes and reducing educational inequality.
SDG 5: Gender Equality	Mobile Literacy Programs	Empowerment and safety for girls and women	Mobile-based literacy and awareness programs enhance digital inclusion, promote financial literacy, and provide safety tools, empowering women with knowledge, confidence, and participation in education and decision-making.
SDG 8: Decent Work & Economic Growth	E-commerce & Freelance Portals	Economic independence and reduced urban migration	Digital marketplaces enable rural artisans, farmers, and youth to access wider markets and remote work opportunities, fostering entrepreneurship, increasing income, and reducing migration to urban areas.
SDG 17: Partnerships for the Goals	Satellite Internet / NGO Collaborations	Sustainable infrastructure and resource pooling	Partnerships between governments, NGOs, and tech providers facilitate satellite internet deployment, digital training, and infrastructure sharing, ensuring long-term sustainability and scalability of rural development initiatives.

Figure 5. Results of Data Analysis

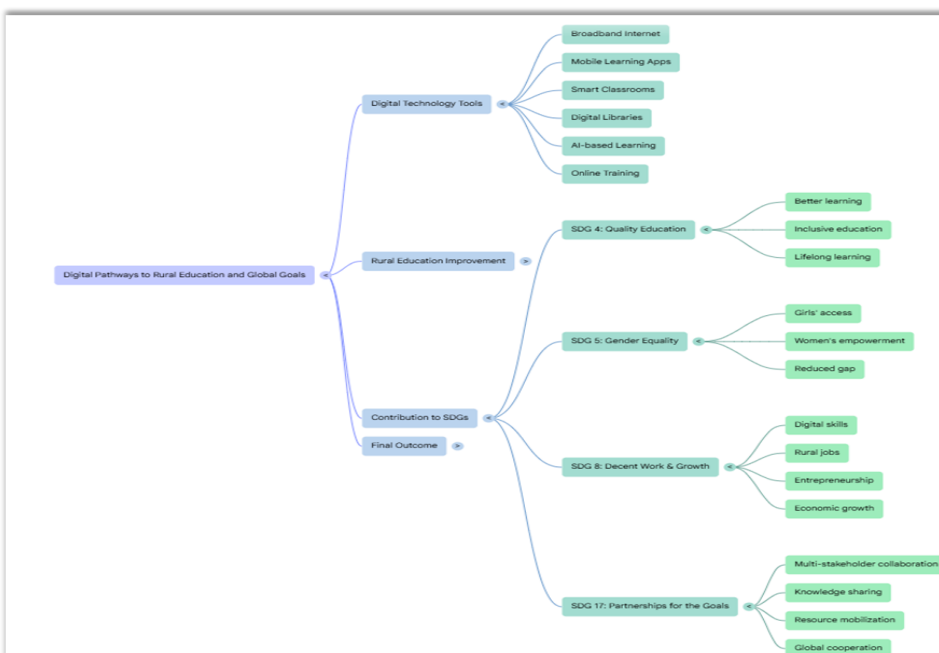


Figure 6. Result of Data Analysis Framework

Digital education promotes workforce preparedness and lifelong learning. Digital initiatives with a gender focus lessen societal injustices. Digital livelihoods boost rural economies and decrease migration. Collaborations are necessary for scalability and infrastructure.

Conclusion

A potent route to attaining equitable and sustainable development is the incorporation of digital technology into rural education institutions. Digital education is a cross-cutting enabler for several SDGs by raising educational standards, advancing gender equality, expanding economic opportunities, and cultivating partnerships. To optimize its impact, a comprehensive strategy that incorporates infrastructure, capacity building, inclusive policies, and cooperative partnerships is necessary. SDG 4, SDG 5, SDG 8, and SDG 17 may all be achieved with the use of digital technology, as evidenced by the integration of AI learning platforms, mobile literacy initiatives, digital markets, and partnership-driven connectivity solutions. When combined, these resources promote gender equality, inclusive education, economic resiliency, and cooperative development, opening the door for long-term rural change.

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