



**Review On Impact of Digital Inclusion as A Tool for Equity Under Sustainable Development Goal 4**

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**Abstract:** Sustainable Development Goal 4 aims to ensure inclusive and equitable quality education for all by 2030. This paper examines digital inclusion — defined as equitable access to affordable internet, devices, digital literacy, and relevant content — as a critical enabler of educational equity under SDG 4. The review finds that digital inclusion reduces geographic, gender, and disability-based disparities by expanding access to quality learning resources and 21st-century skills. Evidence from initiatives like India’s DIKSHA and UNICEF’s Giga program shows improved learning outcomes for marginalized groups when connectivity is paired with teacher training and local-language content. However, persistent barriers including infrastructure gaps, device affordability, and low digital literacy among teachers and parents limit its equity impact. The paper argues that digital inclusion is a necessary but insufficient condition for SDG 4: it acts as a multiplier only when integrated with broader investments in electricity, pedagogy, and culturally relevant curricula. Without accelerated efforts to close the digital divide, equitable quality education at scale will remain unattainable for vulnerable populations by 2030.

**Keywords:** Digital inclusion, SDG 4, educational equity, digital divide, inclusive education, ICT in education.

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**Introduction-**

Sustainable Development Goal 4, adopted by all United Nations Member States in 2015, commits the global community to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” by 2030. At its core, SDG 4 recognizes that education is both a fundamental human right and a key driver of sustainable development, poverty reduction, and reduced inequalities. Yet, progress remains uneven. UNESCO’s 2023 Global Education Monitoring Report estimates that 250 million children and youth remain out of school, with the deepest exclusion affecting girls, children with disabilities, and learners in

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rural or conflict-affected regions. The rapid digitization of society has made digital inclusion a decisive factor in educational equity. Digital inclusion refers to the activities necessary to ensure that all individuals have access to, and skills to use, affordable information and communication technologies. This includes reliable internet connectivity, appropriate devices, digital literacy, and culturally relevant content. During the COVID-19 pandemic, the divide between digitally included and excluded learners became starkly visible: while some students transitioned seamlessly to online platforms, others experienced complete learning disruption due to lack of access. This paper reviews the role of digital inclusion as a tool for advancing equity under SDG 4. It explores how digital technologies can bridge geographic, socio-economic, gender, and disability-based gaps in education, while also critically examining the structural barriers that prevent digital inclusion from translating into equitable outcomes. The analysis draws on global and Indian initiatives to assess conditions under which digital inclusion successfully promotes SDG 4 targets, particularly 4.4 on skills for employment and 4.5 on eliminating disparities. Understanding this relationship is essential because, without deliberate strategies to close digital gaps, the promise of inclusive and equitable quality education will remain out of reach for the world's most marginalized learners by 2030.

#### **Sustainable Development Goal 4**

The 2030 Agenda for Sustainable Development is framed by 17 Sustainable Development Goals (SDGs) that aim to address the world's most pressing challenges. These goals are grouped under five key objectives – people, planet, prosperity, peace and partnership – which guide international efforts to tackle economic, social and environmental issues.<sup>8</sup> These goals are not legally binding but function as a normative framework that emphasises the shared commitment and collective responsibility of the international community to achieve sustainable development by 2030. Among these, SDG4 specifically focuses on 'quality education.' SDG4 seeks to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.' The United Nations Educational, Scientific and Cultural Organization (UNESCO) guide to SDG4 states that there are four key features to the goal: 'a broad scope ensuring lifelong opportunities for all; renewed focus on equity, inclusion and gender equality; renewed focus on effective learning [and]; new focus on relevance of learning. Although articulated as a stand-alone goal, SDG4 is also central to the realisation of the 2030 Agenda as a whole.<sup>11</sup> The inextricable link between increased access to education and major humanitarian challenges such as poverty (SDG1), hunger (SDG2) and overall well-being (SDG3) is well documented.<sup>12</sup> This link often goes both ways. For example, SDG8 seeks to promote inclusive and sustainable economic growth, full and productive employment and decent work for all. Increased competition and digitisation have driven up the need for skill-intensive technological innovations.<sup>13</sup> These economic shifts can drive changes in educational approaches which could impact how 'quality education' looks now and in the future.

## **Impacts of Digital Inclusion on SDG 4**

### **1. Equity:**

Bridging Access and Quality Gaps: Digital technologies, including mobile learning, online platforms, and educational, open-source resources, allow students in remote or underserved areas to access high-quality materials and expert teaching not previously available, effectively leveling the playing field.

### **2. Empowering Vulnerable Groups :**

Digital initiatives significantly improve access for girls, ethnic minorities, and children with disabilities. In 2022, 91% of upper secondary schools had electricity, and 69% had internet access, enabling better educational opportunities for these groups.

### **3. Enhanced Pedagogical Approaches:**

Digitalization supports personalized and inclusive learning, such as Universal Design for Learning (UDL) and blended learning, which adapt to diverse student needs and improve engagement.

### **4. Developing Future-Ready Skills:**

Beyond academic knowledge, digital inclusion provides youth and adults with essential ICT and technical skills necessary for employment, decent work, and entrepreneurship.

### **5. Lifelong Learning Opportunities :**

Digital tools provide flexible, self-paced learning avenues for working professionals, parents, and adults, facilitating education beyond traditional schooling.

## **Mechanisms of Digital Inclusion for Equity**

### **1. Infrastructure & Access (Affordability/Availability):**

Providing affordable, high-speed broadband and connected devices allows individuals to participate in the digital world, reducing geographical barriers between rural and urban areas.

### **2. Digital Literacy & Up skilling:**

Educating users through digital skills training empowers them to find information, use online tools safely, and engage in the workforce. This includes fostering "digital career literacy" (collecting, communicating, curating).

### **3. Accessible Design (Universal Design for Learning):**

Designing digital tools, websites, and applications that comply with accessibility standards (such as screen readers) ensures people with disabilities are not left behind.

### **4. Technological Empowerment (AI and IoT):**

Utilizing emerging technology, such as AI and IoT, improves accessibility for non-native speakers, provides technical support, and supports agricultural improvements for farmers.

### **5. Targeted Support Services:**

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Providing tailored technical support and digital training in local communities ensures that new users can confidently and safely navigate the digital environment.

### **Targets, indicators, and progress**

Since 2015, contributions on behalf of GCE's policy were made to give precise division for SDG4. SDG 4 consists of 7 targets, 3 means of actual application, and 12 indicators. Eight of them are supposed to be achieved by 2030, while one is to be achieved by 2020 and the rest have no target years.

#### **Target 4.1: Free primary and secondary education**

The main mission of this target is: "By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to a relevant and effective learning outcome. In choosing this mission, different issues were considered, with the mission statement itself stipulating that: students are publicly-funded, engaged through inclusive education regardless of their differences, resources, and means are equitably distributed, education has to be instrumental towards a profound learning outcome regardless of race, gender or ethnicity.

This target has two indicators:

Indicator 4.1.1: "Proportion of children and young people (a) in grade 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) Mathematics, by sex"

Indicator 4.1.2: "Completion rate (primary education, lower secondary education, upper secondary education).

#### **Target 4.2: Equal access to quality pre-primary education**

World map for indicator 4.2.2 in 2015 - Total number of students in the theoretical age group for pre-primary education enrolled in that level, expressed as a percentage of the total population in that age group. The full main aim of this target is: "By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education.

This target has two indicators:

Indicator 4.2.1: "Proportion of children under 5 years of age who are developmentally on track in health, learning, and psychosocial well-being, by sex"

Indicator 4.2.2: "Participation rate in organized learning (one year before the official primary entry age), by sex" At the global level, the participation rate in early childhood education was 69 percent in 2017, up from 63 percent in 2010. However, considerable disparities were found among least developed countries with rates ranging from 7 percent to nearly 100 percent.

#### **Target 4.3: Equal access to affordable technical, vocational, and higher education**

The full title of this target is: "By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university."

This target has one indicator:

Indicator 4.3.1 is "Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex" In terms of the progress made, global participation in tertiary education reached 224 million in 2018, equivalent to a gross enrollment ratio of 38%. Studies have shown that investment to education boost a positive mainstream for children to study at schools. In addition, computer-assisted learning had more positive effect compared to having new teaching materials.

**Target 4.4: Increase the number of people with relevant skills for financial success**

The full title of this target is: "By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

This target has one Indicator:

Indicator 4.4.1 is the "Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill".

**Target 4.5: Eliminate all discrimination in education**

The full title of this target is: "By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations."

This target has one indicator:

Indicator 4.5.1 is "Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators".

**Target 4.6: Universal literacy and numeracy**

The full title of this target is: "By 2030, ensure that all youth and a substantial proportion of adults, both men, and women, achieve literacy and numeracy."

This target has one indicator:

Indicator 4.6.1 is the "Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex". Population census and household surveys regarding simple sentences used in daily life will identify literacy data. It is one of the processes to recognize the current literacy data in order to achieve the goals set forth by the SDGs. "Despite the steady rise in literacy rates over the past 50 years, there are still 773 million illiterate adults around the world, most of whom are women". To facilitate the expansion of comprehensively designed basic learning programs, providing a variety of learning methods and setting standards for gradual progression by ability are required. In order to expand the learning programs, more precise information collection is required. To collect this information, Global Alliance to Monitor Learning (GAML) is developing the necessary tools for methodology and standardization.

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### **Target 4.7: Education for sustainable development and global citizenship**

The full title of this target is: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development."

This target has one indicator:

Indicator 4.7.1 is the "Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in (a) national education policies; (b) curricula; (c) Teacher education; and (d) student assessment.

### **Conclusion**

Achieving SDG4 by 2030 hinges on India's decisive action to strengthen digital inclusion within its educational framework. The COVID-19 pandemic highlighted the critical role of digital technologies in modern education, but the need for digital inclusion of students did not end with the return of students to the classroom. It is imperative that every student, regardless of their background, has equitable access to the tools essential for 21st-century learning. While some progress has been made to overcome disparities in digital inclusion for students, particularly during the pandemic, the discontinuation of many programs post-lockdowns has left vulnerable students at a disadvantage. Many existing programs and initiatives are aspirational and lack concrete plans and implementation. To ensure that all students can benefit from a quality education in a digital age, must commit to sustained investment, comprehensive policies and targeted action plans. It is beyond the scope of this article to determine the exact nature of such policies, and this is a fundamental research gap that must be addressed. At a high level, policymakers should consider key issues such as addressing the pre-existing digital inequalities to ensure that access to devices and the internet is both facilitated and funded, and that digital literacy programs are widely implemented, accessible to all, and tailored to the needs of diverse student populations. By prioritising digital accessibility, affordability, literacy and equitable participation in the digital environment, Australia can foster an inclusive educational system that empowers all students to thrive in a digitally driven world – ensuring that the nation meets its SDG4 targets by 2030.

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