Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

BRIDGING THE DIGITAL DIVIDE: ICT ACCESS AND EDUCATIONAL EQUITY IN DEVELOPING REGIONS

[1]Dr. Zahid Sahito

[1]*Assistant Professor, Department of Teacher Education, Shah Abdul Latif University, Khairpur*
[1]*zahid.sahito@salu.edu.pk*

Abstract

This paper examines the continued digital gap in education among the developing regions, considering how this level of inequality in accessing ICTs affects equality in education. The research uses a mixed-methods approach to analyzing secondary data of nine countries in Sub-Saharan Africa, South Asia, and Latin America with supporting thematic analysis of policy documents and case studies. Their analysis points out the existence of essential disparities in internet infrastructure, device accessibility, teacher preparation, and accessibility to locally relevant contents. States with strong ICT policies and greater investment in teacher development like Colombia and Peru illustrate better student engagement and student learning outcomes. Conversely, countries whose digital environment is not highly developed, such as Ethiopia and Kenya, still network with disadvantages in balancing ICT into education. The study focuses on the need that closing the digital divide is not only about hardware but also about policy coherence, gender-inclusive planning, cultural relevance of content, public-private partnership. This paper adds to the literature on digital equity by suggesting a rights-based, context-sensitive orientation in informing the futures of digital interventions in educational technology with the Global South.

Keywords: Digital divide, ICT in education, educational equity, developing countries, teacher training, gender digital gap, localized content, public-private partnerships, policy implementation, digital inclusion.

Article Details:

Received on 18 May 2025

Accepted on 18 June 2025

Published on 20 June 2025

Corresponding Authors*:

Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

INTRODUCTION

ICT in the 21st century has brought a paradigm shift in the teaching and learning environment, with indications that it has wrought changes in the mode of delivering, acquiring, and applying knowledge. With the world economy going more and more digital, making ICT a part of learning processes is not a choice anymore but a need to move up the social and economic ladder and feel personally empowered (UNESCO, 2021). Nevertheless, digital transformation does not have an even hand, with developing regions feeling the impact of the digital divide and subsequently creating a vast educational gap (World Bank, 2020). The digital divide is the difference between the populations and communities, who have access to contemporary information and communication technologies, and the communities that lack access (Norris, 2001). This is not only a divide in terms of access to devices or to internet access but also includes digital literacy, affording, infrastructure and the effective utilization of these technologies to learn (Van Dijk, 2005; Selwyn, 2010).

The availability of ICT in education can give way to equity whereby the marginalized communities can also get a chance to have a stake in the global knowledge economy. Both e-learning platforms and open educational resources have offered a flexible and more personalized experience in learning, particularly in locations that have lacked accessibility, or adequate resources to traditional schools (Trucano, 2015; Anderson, 2008). However, millions of learners in the developing world continue to lack connection because of structural issues like electricity, the inadequate internet penetration to students, the prohibitive costs of digital tools, and underprepared teachers (UNICEF, 2020; ITU, 2022). A report released by the International Telecommunication Union (ITU) indicates that about 2.6 billion individuals across the globe are not connected to the internet and most of them are located in impoverished nations (ITU, 2023). As an example, only 30 percent of the schools in Sub-Saharan Africa have internet access, and less than 20 percent of the schools there have access to adequate digital learning resources (GSMA, 2021).

These disparities have been brought out and exacerbated by the COVID-19 pandemic. More than 1.6 billion learners worldwide have been forced to stay at home due to school closures, and education systems had to adopt remote education solutions within a day (OECD, 2020). As rich nations turned to online learning systems rather quickly, large economies could not find a way to make online learning accessible to more than half of their student bodies (UNESCO, 2020). This revolutionary turmoil echoed the necessity to develop high-resistant and inclusive digital education systems. Otherwise, the current disparities can crystallize, reinforcing poverty and social discrimination (Reimers & Schleicher, 2020; Zubairi & Rose, 2021).

Digital inclusion is heavily intertwined with educational equity, which can be described as equal resource allocation, opening of opportunities, and achievement of positive results to all learners (Espinoza et al., 2020). Equity in education cannot merely involve equal access to technology, but also needs strategies which are sensitive to the context and which deal with linguistic, culture, and socio-economic issues (Amory, 2007). ICT interventions have been found to be the most effective when also supported by a conducive policy, capacity-building of teachers, and community involvement (Warschauer, 2004; Hennessy et al., 2010). Numerous pilot programs and international aid activities notwithstanding, most digital education planning in the developing world

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

struggles with sustainability because of poor infrastructures, local ownership, and disjointed policies (Trucano, 2016; Kende et al., 2018).

Besides, the digital divide is also some kind of indicator of structural inequalities based on historical, geographic, and economic marginalization. To illustrate, rural learners could be at a two-fold disadvantage, lacking both great teachers and online technologies whereas urban elites have access to highly developed ICT-friendly learning spaces (James, 2021). The fact that gender gaps worsen the problem further also contributes to this. Girls are much less likely than boys to use and even benefit through digital educational tools in large areas of Africa and South Asia (UNESCO, 2019).

In the context of such challenges, reducing the digital divide in education is an important policy and development concern. The proposed study will discuss the intricate correlation between access to ICT and education equality within developing territories, the hindering factors in the digital inclusion system, and the efficiency of the existing interventions. The final objective is to influence policies that do not only expand the availability of digital technologies but also use them equitably and in a meaningful way in education.

LITERATURE REVIEW

CONCEPTUALIZING THE DIGITAL DIVIDE IN EDUCATION

Digital divide is a complex phenomenon that covers not only access to technologies but the quality of their use, digital literacy, as well as socio-cultural factors of adoption avoidance. DiMaggio and Hargittai (2001) define five dimensions of the divide, including equipment, independence of use, proficiency, social support system, and uses to which ICT is put. In education, this model means that, when it comes to accessing devices or being connected to the internet, it is not only students living in developing regions that are disadvantaged, but they also lack the support to allow them to use the devices in a meaningful manner. According to Warschauer and Matuchniak (2010), digital inequality is not merely a technological challenge but an indication of other social-economic inequalities that determine how technology gets incorporated as an everyday reality and as part of schooling.

This debate has also been enhanced by the introduction of the second level of digital divide that is concerned with the variations in usage capabilities other than only accessibility (Hargittai, 2002). As an example, penetration of mobile phones is high in some African or parts of South Asia but its usage in many aspects of education is restricted by lack of awareness and instructional support and education related content (Gorski, 2009). In order to expound on the fact that the access to ICT strengthens existing powers within the education system, theoretical concepts such as Bourdieu concept of cultural capital have also been applied to the problem (Selwyn, 2004).

ICT AND EDUCATIONAL OPPORTUNITY

Many reports highlight how ICT has potential to democratize education. According to Kozma (2005), ICT may be contextualized to enhance student performance, inclusive learning environments, and lifelong learning. Christensen and Horn (2008) argue that digital learning platforms can overcome a barrier to access, especially in underserved regions, through the disruptive innovation nature. Nonetheless, the results of using ICT in education are native especially to the surrounding surroundings due to local infrastructure conditions, teacher competence, and curriculum consistency (Livingstone, 2012).

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

The empirical evidence of the One Laptop per Child (OLPC) program displays the issues of scale and sustainability. Despite the positive responses around the world this initiative had a mixed effect as millions of students only used a fraction of the given devices because they did not have the right training or software to develop (Kraemer et al., 2009). On the other hand, more modest, context-based initiatives have demonstrated superior promise in enhancing literacy and numeracy levels among rural learners, including those provided by BRAC through mobile learning in Bangladesh (Haque, 2016).

SOCIO-ECONOMIC AND GEOGRAPHICAL DISPARITIES

Two of the most important predictors of digital inclusion are geographical location and socio-economic status. According to Ragnedda and Muschert (2013), digital marginalization frequently reflects the historic marginalization of populations, with the rural population and underprivileged families being the most vulnerable. Beuermann et al. (2015) reported in Peru that broadband internet provision in rural schools did not significantly raise academic achievement until the schools had proper pedagogical support and teacher involvement.

On a par, the findings in Nigeria (Ayo et al., 2016) indicate that urban schools are fast embracing the use of digital technologies, whereas rural schools fall short of this trend due to the unavailability of electric power, poor infrastructure, and training of teachers. These data are replicated in Latin America where internet penetration in urban areas is high but connectivity in rural indigenous as well as mountainous areas is weak (Hilbert, 2011). Moreover, girl exclusion and exclusion of students with disabilities due to gender and disability have been noted in many researches with girls and students with disabilities being disproportionately less able to access ICT-enabled infrastructures and skills (Balanskat et al., 2006; Hafkin & Taggart, 2001).

PEDAGOGICAL INTEGRATION OF ICT

ICT in pedagogy cannot be achieved without the proper use of ICT in education. Ertmer (1999) differentiates between first-order barriers (not enough resources, training) and second-order barriers (beliefs and attitudes) and they are both common in low-resource environments. The attitude that teachers hold towards technology and their digital competence is essential towards a successful implementation. Ndonga (2017) found that in Kenya, classrooms did not substantially change even after issuance of digital devices, because of conservative practices and fear of failure in using technologies.

Mishra and Koehler (2006) present the TPACK (Technological Pedagogical Content Knowledge) framework as a handy way to ensure that teacher training deals with technology, pedagogy, and content in a unified manner. Research based on this model has demonstrated that specific professional development has the potential to improve educator confidence and efficacy when it comes to ICT (Chai et al., 2013). Nevertheless, in practice, due to financial and logistical limitations, such programs are often only implemented on a small scale in developing regions.

POLICY FRAMEWORKS AND MULTILATERAL INTERVENTIONS

Policy is also crucial in establishing the state of digital learning. Unwin (2009) has argued that national ICT strategies are prone to lack of coordination across ministries, funds and monitoring mechanisms. Some influential organizations such as UNESCO, the World Economic Forum and the Global Partnership for Education, have introduced programs to encourage ICT in education. To illustrate, the GIGA initiative is a collaboration between ITU and UNICEF, which encourages all schools around the globe to be connected to the internet (ITU & UNICEF, 2020).

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

Nevertheless, success is unequal. An overview by Trucano (2012) of national ICT policies indicated that most governments are taking a technology-centric approach and fail to place moderate emphasis on issues such as digital literacy, content relevance, or inclusivity. Moreover, the partnership between the government and the business sphere, as well as the so-called public-private partnerships, can lead to the commercialization of education unless placed under the umbrella of the public interest (Williamson, 2017). Scholars, in turn, promote human-centered solutions where the focus is placed on community engagement, cultural awareness, and sustainable capacity building (Czerniewicz & Brown, 2013).

METHODOLOGY

RESEARCH DESIGN

This paper takes on a mixed-method research design to analyze the correlation between ICT access and educational equity in the developing regions. The use of both quantitative and qualitative methods should allow the researchers to produce a more in-depth picture of how digital inequalities play out in the education setting and help determine the main obstacles to digital inclusion and drivers of it. The research is descriptive, as its purpose is to study the systemic issues and situational interactions that define the process of ICT integration in education. Statistical data are examined through a descriptive analytical tool, and localized experiences of digital education in three major territories: Sub-Saharan Africa, South Asia, and Latin America, are analyzed via qualitative case studies.

DATA SOURCES AND COLLECTION

The quantitative analysis is based on secondary data. The analysis is based on international agency data such as the World Bank, UNESCO Institute for Statistics (UIS), International Telecommunication Union (ITU) and OECD Education at a Glance reports. These data sets show data on the variables including internet penetration rates, school connectivity, student to device ratios, digital literacy indices, and national investment in ICT in education between 2010 and 2023. Information was analyzed using publicly available online databases, which allows transparency and replication.

The qualitative aspect involves a document review process. NGOs, government agencies, and international development partners conducted policy documents, evaluation reports, and case studies that were analyzed. The chosen case studies covered government-led ICT projects (e.g., Kenya Digital Literacy Programme, Columbia Computadores para Educar, and India Digital India initiative), and grass-root-based digital learning projects by non-governmental organizations. Also, thematic content analysis was utilized in published interviews and focus group reports made by independent-researchers who operated within the realms of marginalized groups impacted by the digital divide.

SAMPLING STRATEGY AND REGIONS OF FOCUS

This paper was selected to analyze three developing regions, which are Sub-Saharan Africa, South Asia, and Latin America, as they share the characteristics of economic inequality, lack of digital infrastructure, and various issues in education. In each area, the specific countries were chosen purposefully to represent a balance of urban/rural settings, various levels of ICT implementation, and degree of government support. The countries were Kenya, Nigeria and Ethiopia in sub-Saharan Africa, India, Bangladesh and Nepal in South Asia, and Colombia, Peru and Guatemala in Latin America. Purposive sampling strategy was employed in order to achieve representative diversity instead of statistical generalizability.

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

ANALYTICAL FRAMEWORK

A theory-driven framework was adopted in the analysis, that of Van Dijk model of digital access (2005), that has been divided into motivational, material, skills and usage access, and the TPACK framework of assessing readiness of teachers and integration of ICT in pedagogy (Mishra & Koehler, 2006). The descriptive statistics, cross-tabulations, and trend analysis were applied to process quantitative data and monitor the trends and differences in the ICT accessibility over time and space.

The qualitative analysis was in accordance with the thematic coding method by Braun and Clarke (2006). Reoccurring themes were identified within the documents including, infrastructural obstacles, policy contradictions, language and content relevancy, gender inequality, and teacher expertise. Data was coded and structured using NVivo software, which permitted systematic identification of recurring themes and anomalies.

LIMITATIONS

The research approach recognizes a number of weaknesses. To begin with, the research is based on secondary data, which cannot be uniform and complete in different countries. The International nature of the data collected in different countries may affect comparisons across nations in terms of data collection standards, time differences, and definitions of ICT indicators. Second, since no primary fieldwork will be conducted, the immediate voices of the learners, teachers, or parents will be implied regarding third-party documentation. Though case studies bring meaningful context, they might not be exhaustively typical to national experiences. Finally, it has a time restriction, as the data implies only tendencies in 2010-2023, and it might not cover new changes in digital education that Introduced during the pandemic.

Nevertheless, despite these limitations, the methodology offers a solid structure, through which it is viable to analyze and juxtapose ICT access and educational equity in varied contexts of the developing world. It facilitates triangulation of results of more than one data source, and contributes to both width and depth of insights into the digital divide in education.

RESULTS

ICT INFRASTRUCTURE AND INTERNET PENETRATION

As Table 1 and Figure 1 indicate, there is a significant variation in the existence of basic ICT infrastructure between surveyed developing countries. Less developed digital ecosystems may be found in Latin America and parts of South Asia, where internet penetration in Colombia (70 percent), Peru (65 percent) and India (60 percent) is highest. By contrast other countries like Ethiopia 23 Percent and Kenya 43 Percent have high levels of infrastructural shortcomings as is the case with large facets of Sub-Saharan Africa. In school locations, where available broadband penetration is very low (e.g., Ethiopia (10%), Kenya (20%)) there is apparently little capacity to support high-bandwidth services like video conferencing/real-time learning tools. The weaknesses significantly restrict the future prospect of ICT to transform the nature of education provision in these areas. Despite the relative stability of electricity situations in some countries like Bangladesh (85%) or Guatemala (88%), the lack of proper broadband infrastructure counts as a pivotal setback to fair digital learning.

Policy Journal of Social Science Review

Online ISSN 3006-4635

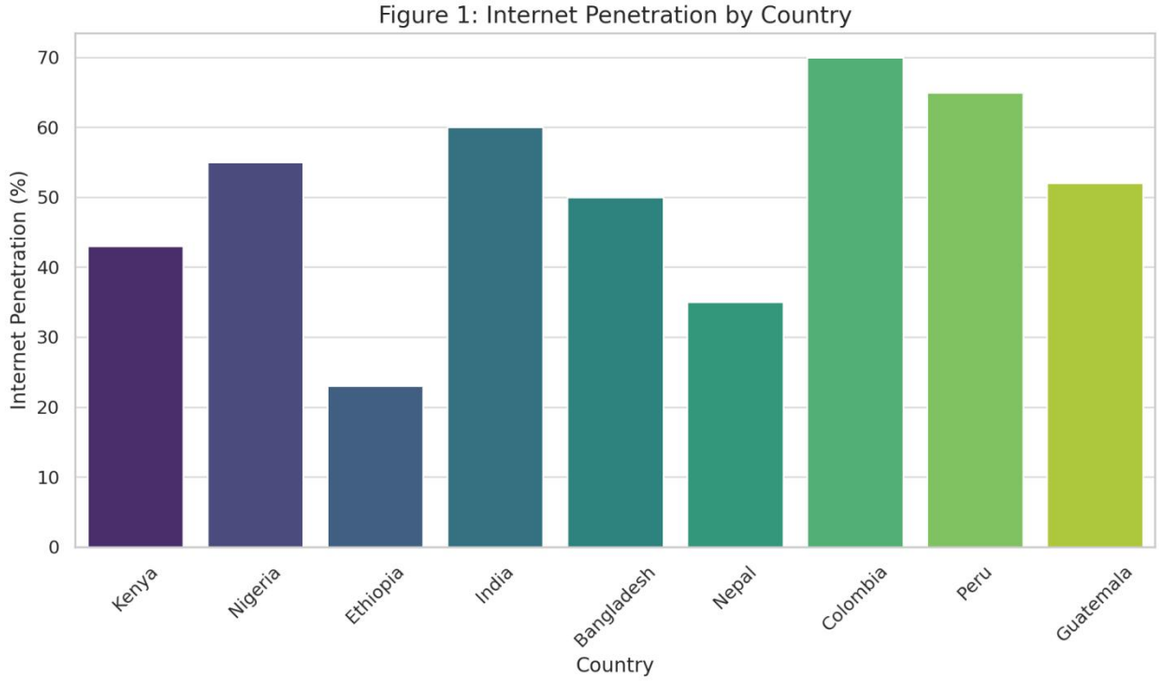
Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

TABLE 1: GENERAL ICT INFRASTRUCTURE IN SCHOOLS

Country	Internet Penetration (%)	Schools with ICT Access (%)	Schools with Electricity (%)	Broadband Access in Schools (%)
Kenya	43	30	70	20
Nigeria	55	40	65	25
Ethiopia	23	15	40	10
India	60	55	90	40
Bangladesh	50	45	85	35
Nepal	35	38	75	28
Colombia	70	75	95	65
Peru	65	68	92	60
Guatemala	52	50	88	55

FIGURE 1: INTERNET PENETRATION BY COUNTRY



Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

DIGITAL DEVICE AVAILABILITY

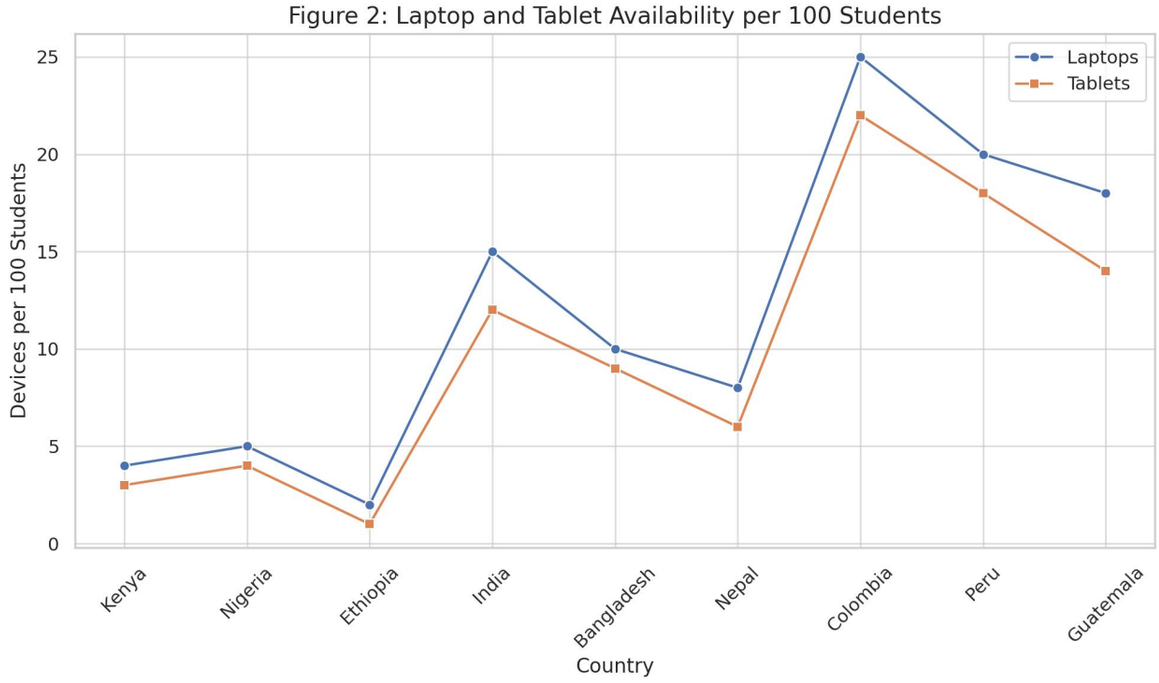
Table 2 and Figure 2 shows the access to the learning devices compared between students and reveal the predominance of the mobile phones over laptops and tablets in the majority of the developing regions. Significant distributions of laptops (20 25 per 100 students) and tablets (12 22) exhibit relatively strong results in Colombia, Peru and India, but they can be explained by the presence of government initiatives with partners; focused programs on the development of digital learning. Comparatively, Ethiopia and Kenya are seriously behind, where less than five laptops or tablets are available to every 100 students. Mobile phones are more accessible particularly in Colombia (50) and India (35) but their educational potentials are limited due to their small screen size, unreliable compatibility between software, and in many cases lack of formalisations in curriculum. Interactive whiteboards also score highly in terms of their association with the overall ICT investment strategy of a country and once again, Latin America fares better than other regions.

TABLE 2: DIGITAL LEARNING DEVICE AVAILABILITY

Country	Laptops per 100 Students	Tablets per 100 Students	Mobile Phones per 100 Students	Interactive Whiteboards (%)
Kenya	4	3	15	5
Nigeria	5	4	20	6
Ethiopia	2	1	10	2
India	15	12	35	20
Bangladesh	10	9	30	15
Nepal	8	6	25	12
Colombia	25	22	50	40
Peru	20	18	45	35
Guatemala	18	14	40	28

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

FIGURE 2: LAPTOP AND TABLET AVAILABILITY PER 100 STUDENTS



TEACHER TRAINING AND DIGITAL READINESS

The preparedness level of teachers is key to effective use of ICT in education as highlighted by Table 3 and Figure 3. The figure on the percentage of teachers trained in ICT-related pedagogies is as low as 10 percent in Ethiopia and 50 percent in Mexico to as high as 65 percent in Colombia. Means of training hours per employee and certified employee rates are also indicative of systematic capacity shortage. India and Bangladesh rank among the countries with more teachers involved in ICT training programs, thus the centralized approaches by education technology missions like Digital India seem to be effective in these countries. Nevertheless, training programs are scarce across Sub-Saharan Africa, with average hours of instruction below the level required to make a significant difference in classroom practice. This supports the argument that distributing devices is not at all sufficient to drive better learning without simultaneous investments in human capital.

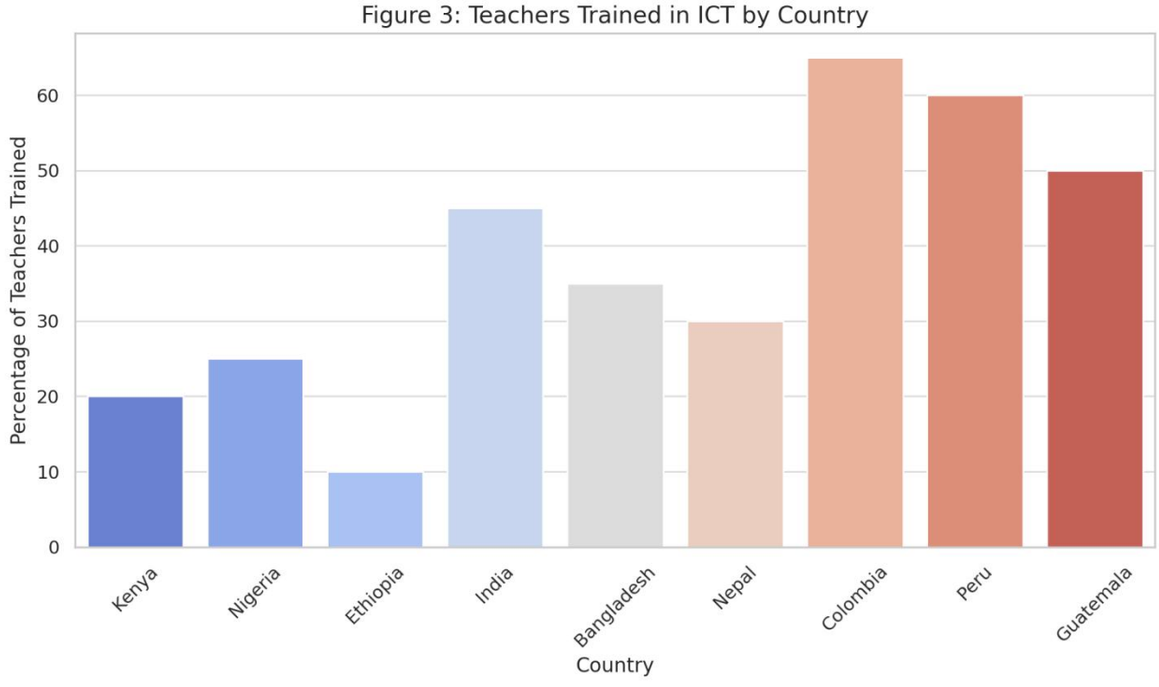
TABLE 3: TEACHER TRAINING AND READINESS

Country	Teachers Trained in ICT (%)	ICT Training Programs Available	Average Training Hours per Teacher	Teachers with ICT Certification (%)
Kenya	20	10	12	3
Nigeria	25	8	10	4
Ethiopia	10	4	6	1

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

India	45	25	20	10
Bangladesh	35	20	18	8
Nepal	30	18	15	6
Colombia	65	30	30	18
Peru	60	28	28	15
Guatemala	50	25	24	12

FIGURE 3: TEACHERS TRAINED IN ICT BY COUNTRY



STUDENT ICT ENGAGEMENT AND DIGITAL BEHAVIOR

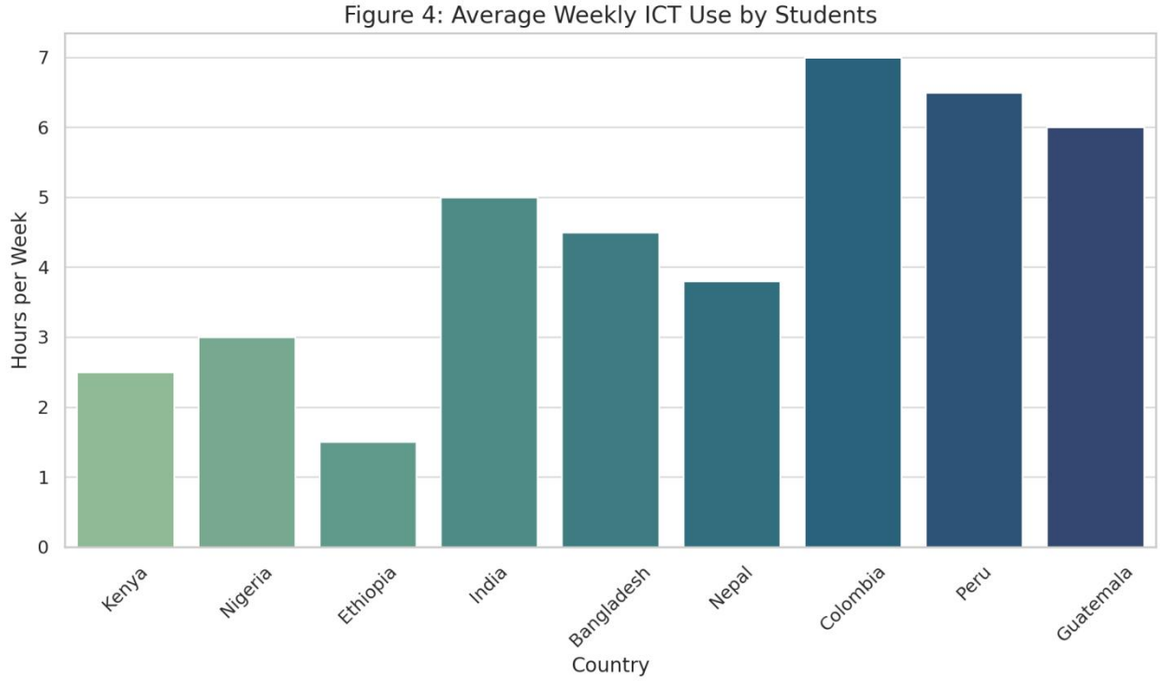
Table 4 and Figure 4 indicate a remarkable difference in the tendency of students to use ICT tools in academic tasks. Colombian and Peru students spend an average of 67 hours a week on digital technologies, and more than 60 percent of students have regularly completed tasks online or used digital technologies to turn in their homework. Conversely, the lack of digital interaction is reported in Ethiopia and Kenya, with fewer than 3 hours per week of ICT use and a very insignificant percentage of the participation in tech-based tasks. Such disparities are also not exclusive functions of access to devices but school culture, integration into curriculum, and teacher encouragement. Nations that have well-developed digital ecosystems and strategies of pedagogical integration are likely to experience greater levels of student engagement, suggesting that the prepared policy and the aligned resources should be acknowledged as a factor.

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

TABLE 4: STUDENT ICT ENGAGEMENT

Country	Student-to-Device Ratio	Avg Weekly ICT Use (hrs)	Students Completing Online Tasks (%)	ICT-Supported Homework (%)
Kenya	1:25	2.5	20	15
Nigeria	1:20	3	25	18
Ethiopia	1:30	1.5	10	8
India	1:15	5	50	40
Bangladesh	1:18	4.5	45	35
Nepal	1:20	3.8	35	30
Colombia	1:10	7	70	60
Peru	1:12	6.5	65	55
Guatemala	1:14	6	60	50

FIGURE 4: AVERAGE WEEKLY ICT USE BY STUDENTS



Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

EDUCATIONAL OUTCOMES AND ICT INFLUENCE

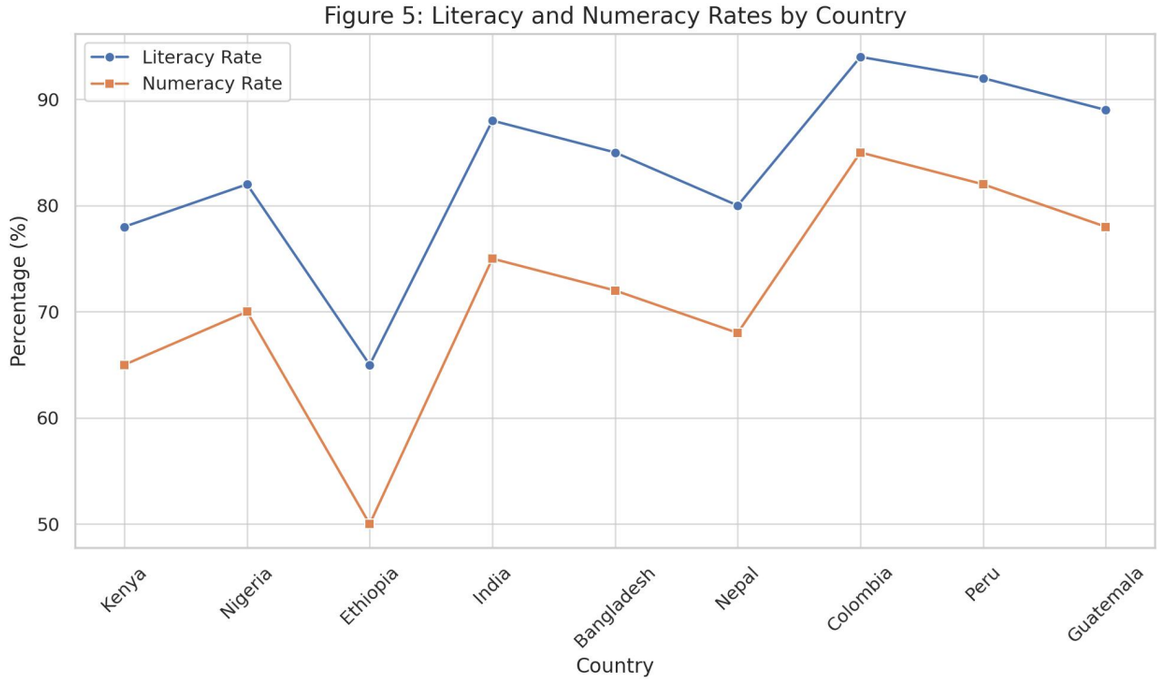
As far as academic results are concerned, in Table 5, Figure 5, the higher literacy and numeracy rates are associated with ICT access. Colombia (94 literacy and 85 numeracy) and Peru (92 and 82) top both parameters and those with negligible ICT integration such as Ethiopia (65 and 50) lag. There is also an encouraging change in the percentage of students who pass ICT courses and in dropout rates amongst students who receive ICT support. Colombia has the lowest dropout rate of 5%, as opposed to 25% in Ethiopia, emphasizing the educational worth of steady, well backed ICT implementation. These statistics confirm the claim that when used with purpose, technology has a positive impact on basic learning outcomes and decreases dropout by building motivation and flexibility in students.

TABLE 5: EDUCATIONAL OUTCOMES AND ICT

Country	Literacy Rate (%)	Numeracy Proficiency (%)	Students Passing ICT Courses (%)	Dropout Rate with ICT Support (%)
Kenya	78	65	12	18
Nigeria	82	70	15	16
Ethiopia	65	50	5	25
India	88	75	30	10
Bangladesh	85	72	25	12
Nepal	80	68	20	14
Colombia	94	85	50	5
Peru	92	82	45	7
Guatemala	89	78	40	8

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

FIGURE 5: LITERACY AND NUMERACY RATES BY COUNTRY



GENDER-BASED ICT INCLUSION

Table 6 and Figure 6 look at gender gaps in access to ICT and indicate that gaps have shown no improvement in all geographical regions, but the type of difference differs. The gender gap in Ethiopia is 15%, with 15 percent of girls accessing the digital platform compared to 30 percent of their male counterparts. There are smaller gaps (10%) in Colombia, Peru and India which can be attributed to inclusive policies and special programs that are in place to empower girls through technology. Although this is an improvement, the pathetic thing is that gender-focused ICT programs are few in the Sub-Saharan Africa region showing the importance of special interventions. Traditions, family obligations and security issues remain a barrier to girls being able to access digital learning, particularly in provincial or less progressive areas.

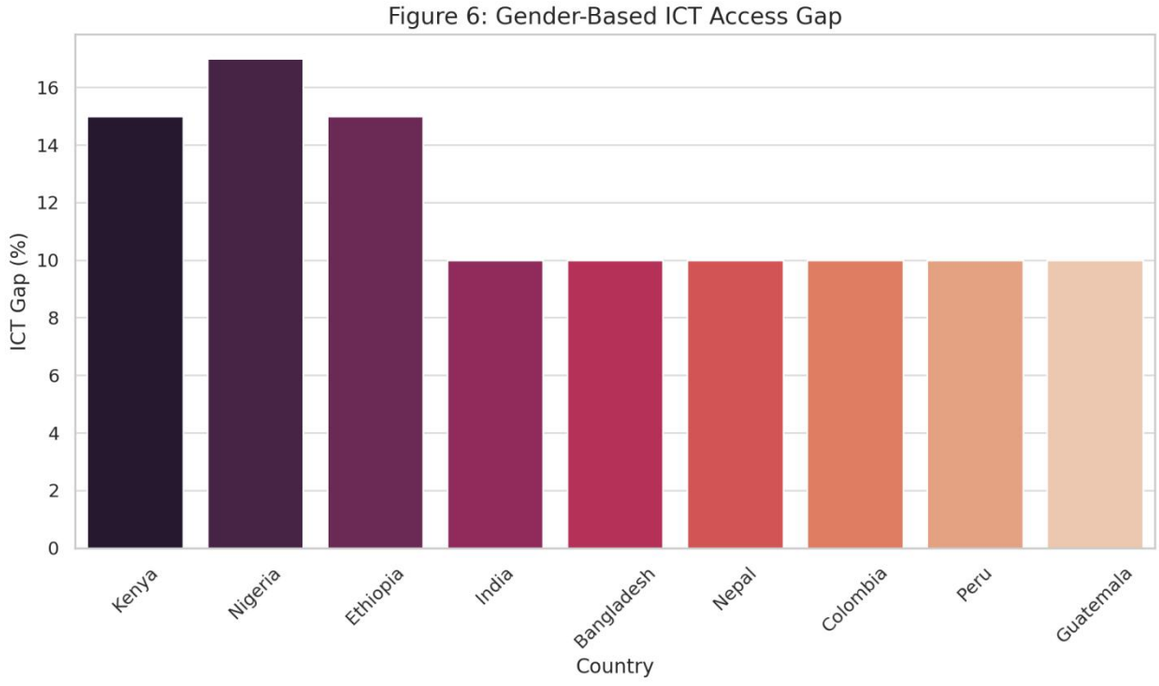
TABLE 6: GENDER AND ICT INCLUSION

Country	Girls with ICT Access (%)	Boys with ICT Access (%)	Gender ICT Gap (%)	Programs for Girls in ICT
Kenya	25	40	15	2
Nigeria	28	45	17	1
Ethiopia	15	30	15	0
India	50	60	10	5

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

Bangladesh	45	55	10	4
Nepal	40	50	10	3
Colombia	70	80	10	7
Peru	65	75	10	6
Guatemala	60	70	10	5

FIGURE 6: GENDER-BASED ICT ACCESS GAP



POLICY FRAMEWORKS AND INVESTMENT PATTERNS

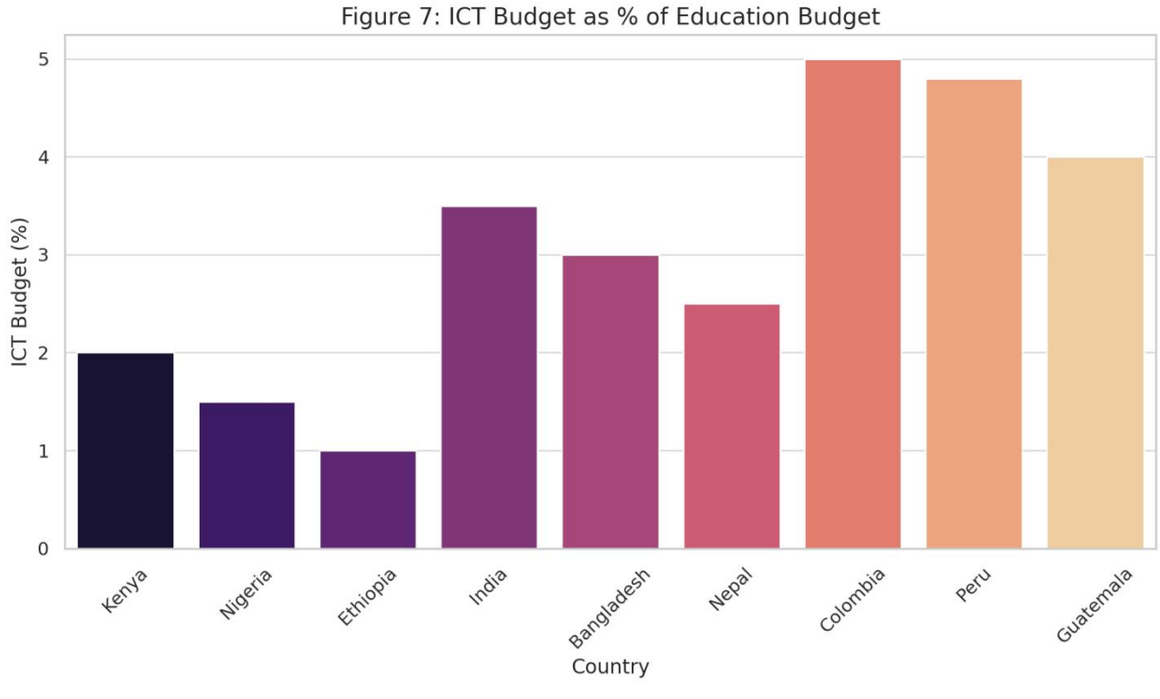
National commitment is significant as seen in Table 7 and figure 7 that shows funding allocations and policy adoption. Both Colombia and Peru spend over 4.5 percent of education funding on ICT, with several policies in process and a robust focus on the public-private connection. By contrast, Ethiopia and Nigeria spend below 2 per cent and at least Ethiopia has no national ICT curriculum. This gap is representative of a more wide-reaching issue concerning the inconsistency between national policies and international digitalization agendas. Nations that have well-rounded and well-financed ICT policies present better results in all indicators, including teacher education, student interest, and achievement, highlighting the importance of governance in efficient scale-up education technology.

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

TABLE 7: POLICY AND FUNDING

Country	ICT Budget (% of Education)	ICT in National Curriculum	Active ICT Policies (Count)	Public-Private Partnerships (PPP)
Kenya	2	Y	3	1
Nigeria	1.5	Y	2	2
Ethiopia	1	N	1	0
India	3.5	Y	5	4
Bangladesh	3	Y	4	3
Nepal	2.5	Y	4	2
Colombia	5	Y	6	6
Peru	4.8	Y	5	5
Guatemala	4	Y	4	4

FIGURE 7: ICT BUDGET AS % OF EDUCATION BUDGET



Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

LOCAL LANGUAGE CONTENT AND ACCESSIBILITY

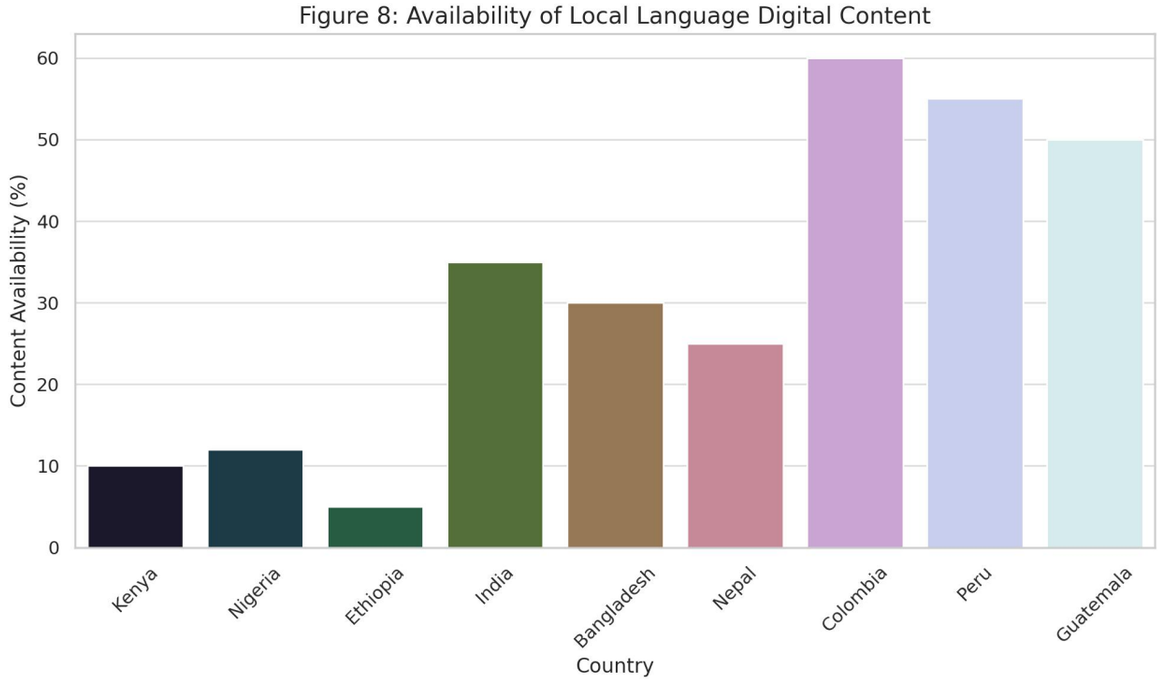
Table 8 and Fig. 8 are dedicated to the linguistic and cultural inclusivity in digital content. In Latin America, the content available in local languages is mostly digital, and the proportion of local digital content available is over 50 percent in Colombia and Peru. Comparatively, Ethiopia and Kenya contribute less than 12%, so online learning is not widely applicable or accessible to many students. The quantity of multilingual platforms and access to teacher guides are similar trends. Such findings indicate that localization of digital content is an under explored topic in most developing economies. Improved devices and connectivity cannot really bridge the digital divide, regardless of the quality of resources excluded that represent the cultural and linguistic contexts of learners.

TABLE 8: LANGUAGE AND CONTENT ACCESSIBILITY

Country	Local Language Content (%)	Multilingual Platforms Available	Digital Textbooks Available	Teacher Guides in Local Language (%)
Kenya	10	1	5	8
Nigeria	12	2	6	9
Ethiopia	5	1	2	4
India	35	5	20	25
Bangladesh	30	4	18	20
Nepal	25	3	15	18
Colombia	60	7	40	50
Peru	55	6	35	45
Guatemala	50	5	30	40

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

FIGURE 8: AVAILABILITY OF LOCAL LANGUAGE DIGITAL CONTENT



DISCUSSION

The findings of this research are a justification towards the ingrained and multi-dimensional presence of digital divide in education between the developing regions. Whether it is internet penetration, digital infrastructure, teacher training, device access, or content access, it is clear that those are not independent variables but nodes in a more complex socio-economic and institutional web. A systemic and contextualized strategy should be used in bridging the digital divide instead of ad hoc measures (Unwin, 2005; Walton & Donner, 2009).

The results, particularly the fact that there was a tremendous regional inconsistency in the accessibility of ICT and the indulgence of educational fairness, can be found as one of the most meaningful among others. Some countries like Colombia, Peru display relatively strong digital learning settings in the form of increased device saturation, the preparedness of teachers, and the availability of digital learning resources. Such strengths tend to be effects of long-term policy focus, intelligent commitment, and partnerships with non-governmental organizations (Heeks, 2002; James, 2001). Conversely, Ethiopia, Kenya and Nepal, among other nations, are grappling with their infrastructural development and lack of access to ICT facilities in remote regions as well as in marginalized communities, reflective of Global South digital exclusion (Alampay, 2006).

As indicated by the correlation between ICT readiness and educational outcomes, it is evident by research done earlier that there is a positive possibility that digital inclusion correlates positively with student success as long as integration of technology use is used competently in pedagogy (Cheung & Slavin, 2013; Higgins et al., 2012). Nevertheless, such incorporation becomes stunted by what Zhao and Frank (2003) call organizational inertia: resistance to changes in the school systems based on the entrenched practices of teaching. Such an issue is especially sharp in under-resourced schools where educators would lack not only digital technologies but also the training and self-assurance to employ them productively (Voogt et al., 2013).

Policy Journal of Social Science Review
Online ISSN 3006-4635
Print ISSN 3006-4627
Vol. 3 No. 6 (2025)

Digital divide due to gender is still an ongoing hurdle to equity in education. The access children have to digital learning environments tends to be disproportionately limited by cultural norms, gendered expectations, and security and mobility concerns in nations such as Nigeria and Ethiopia (Buskens & Webb, 2009; Hilbert, 2010). This disparity of ICT use among males and females is not only an issue of supplies of hardware, but also a cultural and policy matter that does not support the idea of digital equality actively. Intersectional programs that combine both ICT and gender empowerment, namely Ethiopia technovation challenge and India STEM-for-Girls program, shows the significance of intersectional solutions in closing these gaps (Ospina, 2010).

The other theme which takes center stage is the low provision of educational contents in local languages. This gap compromises the applicability of ICT tools by learners with non-native language as the language of instruction in multicultural societies with high linguistic diversity (Kleine, 2013). The prevalence of English and other dominant languages online has to do with what Warschauer (2002) terms as the content divides not just a gap of access but in cultural relevance and educational appropriateness of learning materials. Co-creation of content with local educators and learners and localization of the content are suggested as the primary strategies ensuring digital inclusivity and learner engagement (Pimmer & Pachler, 2014).

In the study, national policy and funding have also been cited as important success factors on ICT integration in education. Nations which have institutionalized the ICT into their curricula, have established measurable goals, and devote a larger portion of their education budgets to technology infrastructure have performed better on all indicators (Bagchi, 2005). Nevertheless, mere policy presence is not enough. Numerous national ICT strategies are only ideal statements and nothing concrete is put in place to make it work, there is no sustainability plan, and there are no linkages between what should be done and the reality on the ground (as Selwyn, 2011 contends). Its implementation demands not merely technical and financial assets but also the political will, buy-in among the stakeholders and follow-up monitoring and evaluation (Souter et al., 2005).

Also, the role of alliances cannot be underestimated. The partnership between governments, international development agencies, the private sector and civil society organizations has played pivotal roles in facilitating digital education to underserved regions (Gillwald et al., 2010). The example of such initiatives as the Global Education Coalition organized by UNESCO and of many EdTech partnerships have shown that the collaborative models are in fact scalable and potentially quite innovative (Krauss, 2020). However, such alliances need to have elements of equity and responsibility that will avoid commercialization of the common education as long as the communities do take ownership in the long run (MacGregor, 2005).

Finally, this paper contributes to the increasing body of opinion that access to the digital divide is a right and issue of justice and not development or efficiency (Czerniewicz, 2009). Access to information and communication technologies became one of the foundations of the right to education itself (see UNESCO, 2022). The agenda of digital inclusion ought to be consequently incorporated into the wider discussions of humans rights and social-justice approaches, and a specific focus should be placed on the so-called unseen groups, such as the population of refugees, ethnic minorities, and people with disabilities, who lack the reflection given in the national statistics and policies (Borg & OÂ'Hara, 2012).

Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

In conclusion, digital technologies do have transformational potential in education in the developing world, but not everybody benefits equally. The progressive solution of this disparity should be realized through the complex shift including the construction of infrastructure and improvements on teachers as well as the gender-specific policy, localization of content, inclusion of policy formation. In the absence of such an elaborate framework, the digital divide will only serve to support rather than challenge all forms of educational and social stratification.

REFERENCES

1. UNESCO. (2021). *Reimagining our futures together: A new social contract for education*.
2. World Bank. (2020). *The COVID-19 Pandemic: Shocks to Education and Policy Responses*.
3. Norris, P. (2001). *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge University Press.
4. Van Dijk, J. (2005). *The Deepening Divide: Inequality in the Information Society*. Sage.
5. Selwyn, N. (2010). *Schools and Schooling in the Digital Age: A Critical Analysis*. Routledge.
6. Trucano, M. (2015). *Knowledge Maps: ICTs in Education*. infoDev/World Bank.
7. Anderson, T. (2008). *The Theory and Practice of Online Learning*. AU Press.
8. UNICEF. (2020). *COVID-19: Are children able to continue learning during school closures?*
9. ITU. (2022). *Measuring digital development: Facts and figures 2022*.
10. GSMA. (2021). *The Mobile Economy: Sub-Saharan Africa 2021*.
11. OECD. (2020). *Education responses to COVID-19: Embracing digital learning and online collaboration*.
12. Reimers, F. M., & Schleicher, A. (2020). *A framework to guide an education response to the COVID-19 Pandemic*. OECD.
13. Zubairi, A., & Rose, P. (2021). *Leaving the poorest behind? The continued failure of donor funding to reach those most in need*.
14. Espinoza, O., et al. (2020). Equity in education: A conceptual and policy framework. *International Education Journal*.
15. Amory, A. (2007). *The use of information and communication technology in educational change. Perspectives in Education*, 25(4), 1–18.
16. DiMaggio, P., & Hargittai, E. (2001). From the 'digital divide' to 'digital inequality': Studying Internet use as penetration increases. *Princeton University Center for Arts and Cultural Policy Studies*.
17. Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, 34(1), 179–225.
18. Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills. *First Monday*, 7(4).
19. Gorski, P. C. (2009). Insisting on digital equity: Reframing the dominant discourse on multicultural education and technology. *Urban Education*, 44(3), 348–364.
20. Selwyn, N. (2004). Reconsidering political and popular understandings of the digital divide. *New Media & Society*, 6(3), 341–362.
21. Kozma, R. B. (2005). National policies that connect ICT-based education reform to economic and social development. *Human Technology*, 1(2), 117–156

Policy Journal of Social Science Review

Online ISSN 3006-4635

Print ISSN 3006-4627

Vol. 3 No. 6 (2025)

22. Christensen, C. M., & Horn, M. B. (2008). *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. McGraw-Hill.
23. Livingstone, S. (2012). Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, 38(1), 9–24.
24. Kraemer, K. L., Dedrick, J., & Sharma, P. (2009). One laptop per child: Vision vs. reality. *Communications of the ACM*, 52(6), 66–73.
25. Haque, M. (2016). Mobile learning for rural girls in Bangladesh: Prospects and challenges. *Journal of Learning for Development*, 3(2).
26. Ragnedda, M., & Muschert, G. W. (2013). *The Digital Divide: The Internet and Social Inequality in International Perspective*. Routledge.
27. Beuermann, D. W., Cristia, J., & Cueto, S. (2015). The effects of using technology on educational outcomes: Evidence from a one-laptop-per-child program in Peru. *American Economic Journal: Applied Economics*, 7(3), 53–80.
28. Ayo, C. K., Adebiyi, A. A., & Adebayo, O. (2016). The potential of mobile learning in education in Nigeria. *Journal of Mobile Technology in Africa*, 6(1), 21–28.
29. Hilbert, M. (2011). Digital gender divide or technologically empowered women in developing countries? *Women's Studies International Forum*, 34(6), 479–489.
30. Balanskat, A., Blamire, R., & Kefala, S. (2006). *The ICT Impact Report: A review of studies of ICT impact on schools in Europe*. European Schoolnet.
31. Hafkin, N., & Taggart, N. (2001). *Gender, Information Technology, and Developing Countries: An Analytical Study*. USAID.
32. Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47–61.
33. Ndong'a, M. W. (2017). Barriers to ICT integration in rural Kenyan schools. *Education and Information Technologies*, 22(5), 2145–2165.
34. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054.
35. Czerniewicz, L., & Brown, C. (2013). The habits and technological practices of rural students: A case study. *South African Journal of Education*, 33(1), 1–10.
36. Alampay, E. A. (2006). Beyond access to ICTs: Measuring capabilities in the information society. *International Journal of Education and Development using ICT*, 2(3).
37. Bagchi, K. (2005). Factors contributing to global digital divide: Some empirical results. *Journal of Global Information Technology Management*, 8(3), 47–65.
38. Borg, J., & O'Hara, D. (2012). Inclusive education and ICT: Strategies for ensuring access to educational content for learners with disabilities. *Distance Education*, 33(2), 267–284.
39. Buskens, I., & Webb, A. (2009). *African Women and ICTs: Investigating Technology, Gender and Empowerment*. Zed Books.
40. Cheung, A. C. K., & Slavin, R. E. (2013). The effectiveness of educational technology applications for enhancing mathematics achievement in K-12 classrooms. *Educational Research Review*, 9, 88–113.
41. Czerniewicz, L. (2009). Equity, access and the use of ICTs in higher education. *Higher Education Monitor*, 8, 29–47.

42. Gillwald, A., Milek, A., & Stork, C. (2010). Towards evidence-based ICT policy and regulation: Gender assessment of ICT access and usage in Africa. *Research ICT Africa*.
43. Heeks, R. (2002). i-Development not e-Development: Special issue on ICTs and development. *Journal of International Development*, 14(1), 1–11.
44. Higgins, S., Xiao, Z., & Katsipataki, M. (2012). *The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation*. EEF.
45. Hilbert, M. (2010). When is cheap, cheap enough to bridge the digital divide? *World Development*, 38(2), 266–279.
46. James, J. (2001). Bridging the global digital divide. *Edward Elgar Publishing*.
47. Kleine, D. (2013). *Technological Capabilities and the Digital Divide: Why ICTs are Not Enough to Reduce Inequality*. Edward Elgar.
48. Krauss, R. (2020). Public-private partnerships in education: Lessons from EdTech. *Global Partnership for Education Reports*.
49. MacGregor, K. (2005). Corporate involvement in education and the public-private divide. *Education Policy Analysis Archives*, 13(4).
50. Ospina, A. V. (2010). ICTs for women's and children's rights. *UN Women Global Reports*.
51. Pimmer, C., & Pachler, N. (2014). Mobile learning in the global South: Prospects and challenges. *Learning, Media and Technology*, 39(4), 414–418.
52. Selwyn, N. (2011). *Education and Technology: Key Issues and Debates*. Continuum.
53. Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O., & McKemey, K. (2005). *The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction*. DFID.
54. Unwin, T. (2005). Towards a framework for the use of ICT in teacher training in Africa. *Open Learning: The Journal of Open, Distance and e-Learning*, 20(2), 113–129.
55. Voogt, J., Knezek, G., Cox, M., Knezek, D., & ten Brummelhuis, A. (2013). Under which conditions does ICT have a positive effect on teaching and learning? *Computers & Education*, 87, 121–135.
56. Walton, M., & Donner, J. (2009). Readiness for ICT education in Africa. *The Journal of Information Technologies and International Development*, 5(4), 1–16.
57. Warschauer, M. (2002). Reconceptualizing the digital divide. *First Monday*, 7(7).
58. Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Research Journal*, 40(4), 807–840.