

Tackling Digital Degree in Education: Optimal Use of Green Information and Communication Technology (GICT)

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ABSTRACT

The COVID-19 pandemic has resulted in a significant increase in the use of Information and Communication Technology (ICT) in all areas of the education sector, particularly in developed economies as well as developing countries, regardless of preparedness. This is because, under the new normal, ICT adoption has become ubiquitous and fast-moving, even in the face of impending challenges. In the case of education, in particular, the disruption caused by the pandemic has caused ICT to become an instantaneous apparatus that has sustained the teaching and learning sector during the global lockdown that ravaged the world between 2019 and 2020, with consequences that are still visible today. Once more, the pandemic's outbreak made it clear to world leaders in numerous developing nations that they had no option but to use an ICT tool that was accelerating the growth of their countries' national knowledge bases. Notwithstanding the apparent difficulties integrating ICT into teaching and learning, the COVID-19 pandemic's effects accelerated the spread of ICT, forcing teachers and students in Nigeria and, in fact, around the world, to work online despite their readiness in terms of knowledge, abilities, and resources. In today's globalized world, ICT has become indispensable in filling gaps in the education sector, but it is also important to recognize the role of green information technology. This study examined how ICT instantly filled in the educational gaps during a pandemic-related lockdown, as well as how Green IT impacts our ecology. In order to truly close the digital divide that existed in the education sector in today's carefree world, the research has supplied the essential information and details, as well as recommendations for how to best use ICT tools to secure the ecosystem.

Keywords: ICT, Covid -19 Pandemic, Green IT, Digital Divide.

Aims Research Journal Reference Format:

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1. INTRODUCTION

The digital divide encompasses disparities in access to hardware, internet connectivity, digital literacy skills, and educational resources (Van Dijk, 2005). While some students and educational institutions have access to state-of-the-art technology and high-speed internet, others, particularly those from marginalized communities, lack such resources.

This inequality not only hinders academic achievement but also limits opportunities for skill development and future success in a digitally-driven world (Warschauer & Matuchniak, 2010). In the era of rapid technological advancement, digital technology has revolutionized various aspects of society, including education. However, alongside the transformative potential of digital tools in education, there exists a persistent challenge known as the digital divide. This gap refers to the unequal access to and utilization of digital technologies among students and educators, often exacerbating existing socioeconomic disparities (Warschauer, 2003). As education increasingly relies on digital resources and platforms for learning, addressing the digital divide becomes imperative to ensure equitable access to quality education for all. All computer systems, the internet, telecommunications, digital media, and mobile phones are collectively referred to as information and communications technology, or ICT.

As a result of this, technology is utilized extensively in classrooms as an indispensable tool for instruction and learning. Information and communication technology (ICT) has had a huge impact on the education industry, but none of it—or poor infrastructure deployments—can negate the essential advantages that are anticipated. The effective deployment of ICT tools must prioritize environmental sustainability in order to achieve the necessary protection of our planet Earth. Amidst efforts to bridge the digital divide, there is a growing recognition of the importance of sustainability in technology adoption. Green Information and Communication Technology (GICT) focuses on environmentally sustainable practices in the design, production, and use of information and communication technologies (Barker & Sorrell, 2014). By integrating principles of energy efficiency, resource conservation, and waste reduction, GICT not only mitigates environmental impact but also offers economic benefits and social value (Molla & Cooper, 2019). This study looked at how Green IT affects our ecology and how ICT quickly filled in the educational gaps during a pandemic-related shutdown.

This research aims to explore the optimal use of Green Information and Communication Technology (GICT) in tackling the digital divide in education. The research has provided the necessary data and specifics, along with suggestions on how to best employ ICT tools to secure the ecosystem, in order to effectively close the digital divide that existed in the education sector in today's carefree world by examining current literature and best practices. The study seeks to identify strategies for leveraging GICT to enhance digital access, affordability, and sustainability in educational settings. As digital technology continues to reshape the landscape of education, addressing the digital divide remains a critical challenge. By embracing Green Information and Communication Technology (GICT), educational institutions can not only bridge this gap but also promote sustainability and environmental stewardship. This research seeks to contribute to the growing body of knowledge on GICT in education and provide actionable recommendations for policymakers, educators, and stakeholders striving to create inclusive and sustainable learning environments.

2. LITERATURE REVIEW

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Understanding the Digital Divide

The digital divide refers to the gap between individuals or communities that have access to digital technologies and those who do not (Van Dijk, 2005). Marginalized groups, including low-income families, rural communities, and persons with disabilities, are disproportionately affected by the digital divide, facing barriers to academic success and workforce readiness (Selwyn, 2004).

In education, this gap manifests in disparities in access to computers, internet connectivity, and digital literacy skills among students and educators (Hargittai, 2010).

Implications of the Digital Divide in Education

The disparity not only widens existing achievement gaps but also perpetuates socioeconomic inequalities, limiting opportunities for social mobility and economic advancement (DiMaggio & Hargittai, 2001). The digital divide in education has far-reaching implications for teaching, learning, and educational outcomes. Without equitable access to technology, students from underserved communities are at a disadvantage in accessing online resources, participating in digital learning activities, and developing essential digital skills (Warschauer, 2006).

Existing Strategies for Addressing the Digital Divide

Curriculum Integration: Integrating digital literacy skills into the curriculum and incorporating technology-enhanced learning activities can promote digital fluency and engagement among students (Warschauer, 2003). **Affordable Access Programs:** Implementing initiatives to provide subsidized or low-cost internet access and computing devices for low-income families can help reduce barriers to digital participation (Gillwald, 2005). **Digital Literacy Training:** Providing comprehensive digital literacy training for students, educators, and community members is crucial for fostering digital inclusion and empowerment (Hargittai & Walejko, 2008). Addressing the digital divide in education requires a multifaceted approach that encompasses policy interventions, infrastructure development, and educational initiatives.

Several strategies have been proposed to bridge this gap: **Infrastructure Investment:** Investing in robust ICT infrastructure, including high-speed internet access and computer labs in schools and communities, is essential for ensuring equitable digital access (Warschauer & Matuchniak, 2010). **Community Partnerships:** Collaborating with community organizations, government agencies, and private sector stakeholders can leverage resources and expertise to expand digital access and literacy initiatives (UNESCO, 2020). In the 21st century, digital technology has become an integral part of education, promising to enhance learning experiences and opportunities. However, the digital divide persists, creating disparities in access to and utilization of technology among students and educators. This literature review explores the role of Green Information and Communication Technology (GICT) in bridging the digital gap in education and highlights the optimal strategies for its implementation.

Green Information and Communication Technology (GICT)

Green ICT encompasses environmentally sustainable practices in the design, manufacture, and use of information and communication technologies (ICT) (Barker & Sorrell, 2014). In the context of education, GICT presents an opportunity to address the digital divide while fostering environmental stewardship and sustainability (Zhang et al., 2017). By promoting energy efficiency, resource conservation, and reduced electronic waste, GICT not only mitigates environmental impact but also offers economic benefits and social value (Molla & Cooper, 2019). The research work of Aghware, **Malasowe**, and Ojie (2021) provided the necessary information and details why there should be compulsory implementation of ICT in education to truly bridge the digital gap that existed in the education sector in our today botherless world thus proffering how best to deploy the ICT tools in securing the ecosystem.

Optimal Use of GICT in Education

To effectively tackle the digital divide in education, the optimal use of GICT must prioritize accessibility, affordability, and sustainability. Smith & Marx (1996) take a different track and view technology as a key substitute element in a society. The National Telecommunication and Information Administration (NTIA, 1999) defined the digital divide as the division between those who have access to ICTs and those who do not. Van (2000) identified the X-ray digital divide as a phenomenon that gained traction in the 1990s. In terms of education, countries all over the world work need to find ways to give the younger generation equal access to ICTs and educational services (Mazurek, Winzer, & Majorek, 2000). Nonetheless, there are clear differences in technology between developed and developing nations. While industrialized nations work to close the obvious digital divide, in developing nations the gap widens as a result of the governing class's incompetence and misguided policies. The digital divide is how the World Economic Forum (2000) conceptualized the ICT dichotomies.

Comparably, there is a wide range of ICT penetration and dispersion in developing economies and technologically sophisticated countries. Campbell (2001). The term "technological divide" was used by Rice (2001) to refer to the total digital divide.. Despite the existence of ICTs, empirical reviews conducted by, among others, Lentz & Oden, 2001; Chowdary, 2002; Hartviksen, Akselson & Eidsvik, 2002; James, 2002, 2003; Lim, 2002; Ming & Li, 2002; Moss, 2002, focused on the extensive access to ICTs in terms of exclusive use of available infrastructure, making use of technological determinism theory in their assumptions and inferences. According to Norris (2001), there are three distinct ways that the impression of an ICT access gap can manifest itself: a global divide (i.e., differences in ICT access between nations), a social divide (i.e., differences in ICT access within a country), and a democratic divide (i.e., access based on differences in social class).

Digital Literacy Training: Providing comprehensive digital literacy training for students and educators is crucial for maximizing the benefits of GICT and ensuring inclusive participation in digital learning environments (Hargittai & Walejko, 2008). Several strategies have been proposed to achieve this goal:
Infrastructure Development: Investing in robust ICT infrastructure, including high-speed internet access and reliable hardware, is essential for equitable digital access in educational settings (Warschauer & Matuchniak, 2010).

Sustainable Procurement Practices: Adopting sustainable procurement practices for ICT hardware and software, such as energy-efficient devices and eco-friendly materials, promotes environmental responsibility while minimizing lifecycle costs (Lacity et al., 2012). There is now a social divide in society between those who lack access to the necessary infrastructure for information and communication technologies and those who do. This disparity is primarily known as the "digital divide" (Sunday & Emmanuel, 2014).

Open Educational Resources (OER): Embracing OER, such as freely accessible digital textbooks and online learning materials, can reduce educational costs and enhance accessibility for learners from diverse backgrounds (Hilton, 2016). Collaborative Partnerships: Engaging stakeholders from government, industry, academia, and civil society in collaborative partnerships can facilitate the implementation of GICT initiatives and leverage resources for sustainable development goals in education (UNESCO, 2020). Inadequate use of ICT, including computers, phones, and the internet, is quickly undermining economic progress.

With the introduction of ICTs, social and economic progress resulting from research and unfettered development can also be traced. However, because of their tardiness in establishing social networks, businesses reorienting, and changing service delivery patterns, particularly in the education sector, there are still questions around their adoption.

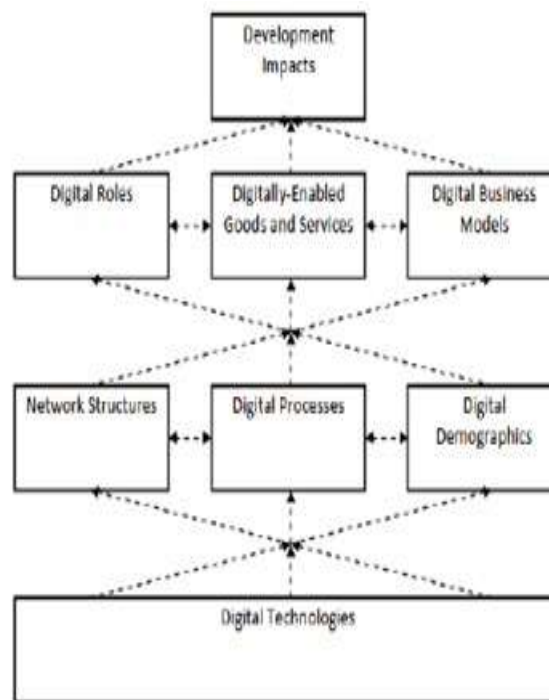


Figure 1: An overview of the digital development paradigm (Richard Heeks, 2016)

Heeks (2016) provided an outline of digital growth in his study paper (figure 1). He described in detail each module of the digital development paradigm and demonstrated how they interact with one another. Upon further examining Richard Heeks' overview, it became evident that environmental sustainability was not taken into account in the development of Green ICT. The field of digital development has changed, and this study will offer a general model that may be used by other institutions and the education industry.

3. METHODOLOGY

The nature of this research and the knowledge that teaching and learning happen every day make it difficult to confine the conversation about the digital divide to a single field. Nonetheless, the methodology of the study involved an examination of the corpus of earlier, peer-reviewed research publications. The goal of this research project is to examine peer-reviewed literature regarding digital degrees in education. To determine if the extent of the digital gap is widening or contracting, the collected data was examined historically and chronologically.

4. FINDINGS AND DISCUSSIONS

The wealth of literature reviewed have shown that there exist digital divide and it is getting wider by the day. Today, there is the realization that lives rotate around digital platforms. We use technology to live, work, play, unlearn, and relearn. Moving forward, computers will inevitably need to be incorporated into our teaching and learning processes. The deployment of ICT devices is therefore the clear path forward in our lives, and it is imperative that everyone, at all levels, embrace ICT. This is evident even to the uninformed. It is accurate to state and draw the conclusion that the digital divide in our society has been primarily caused by the mediation of ICT. If the current government is willing to acknowledge that ICT is here to stay in terms of environmental sustainability and national development through Green Computing, then the corresponding and urgent deployment of ICT can close the gap. To close the growing digital divide, it is also essential to make ICT technology accessible to younger generations.

Table 1. Findings from existing literature

Author(s) & Year	Main Findings
DiMaggio & Hargittai (2001)	Internet use patterns vary across socioeconomic groups, indicating disparities in digital access and skills.
Warschauer (2003)	Technology access is a critical factor in social inclusion, necessitating a rethinking of the digital divide.
Selwyn (2004)	Political and social factors influence perceptions and understandings of the digital divide, shaping policy responses.
Gillwald (2005)	Access to ICT varies across African countries, with implications for digital inclusion and development.
Van Dijk (2005)	Inequality in access to digital technologies exacerbates socioeconomic disparities, widening the digital divide.
Warschauer (2006)	Laptop initiatives in education can bridge the digital divide and enhance learning opportunities for students.
Hargittai & Walejko (2008)	Digital literacy training is essential for maximizing the benefits of GICT and ensuring inclusive participation.
Hargittai (2010)	Digital literacy skills and usage patterns differ among members of the "Net Generation," affecting digital participation.
Lacity et al. (2012)	Sustainable procurement practices for ICT promote environmental responsibility and minimize lifecycle costs.
Barker & Sorrell (2014)	Green ICT promotes energy efficiency and resource conservation, offering economic benefits and social value.

Author(s) & Year	Main Findings
Hilton (2016)	Open educational resources (OER) reduce educational costs and enhance accessibility for learners.
Zhang et al. (2017)	Green IT practices positively impact firm performance, indicating the potential benefits of GICT in various sectors.
Molla & Cooper (2019)	Green IT readiness framework offers a comprehensive approach to integrating sustainability into ICT practices.
UNESCO (2020)	Collaborative partnerships facilitate the implementation of GICT initiatives and leverage resources for sustainable development goals in education.
UNESCO (2020)	Inclusive educational policies and ICT integration are essential for narrowing the digital divide and promoting digital equity.
Aghware, Malasowe, and Ojie (2021)	Provided the necessary information and details why there should be compulsory implementation of ICT in education to truly bridge the digital gap that existed in the education sector in our today botherless world thus proffering how best to deploy the ICT tools in securing the ecosystem.

5. CONCLUSION

In conclusion, the digital divide remains a significant challenge in education, but Green Information and Communication Technology (GICT) offers promising solutions for bridging this gap. By prioritizing accessibility, affordability, and sustainability, educational institutions can harness the power of GICT to create inclusive learning environments that empower learners and promote environmental stewardship. In other to achieve these significant challenges it requires concerted efforts from policymakers, educators, and stakeholders to address. By implementing targeted interventions to improve digital access, literacy, and skills development, society can create more inclusive and equitable learning environments that empower all learners to thrive in the digital age. Although there has been a great deal of study and policy established in this field, the main issue is still execution. Given how rapidly the digital divide is growing, more work needs to be done.

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