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Bridging the Digital Literacy Divide: A Global Comparison of Efforts in Developed and Developing Nations

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Abstract

Access to the digital environment is one of the most important skills within the modern world as it opens the door to self-fulfillment and social integration as well as employment. However, there are still major gaps between the first world and the third world countries on account of differences in the technologies, infrastructures, and resources available to the different countries. This study provides a comparative analysis of the international efforts that have been made towards increasing greater digital competencies and covers topics of infrastructure, policymaking, educational approaches, community impact, and trends. Employing a narrative review approach and following constructivist epistemology and relativist ontology, this study integrates information obtained from 18 peer-reviewed articles, reports, and case studies from 2018 to 2024. As acknowledged from the findings, varied regional issues and accomplishments exist: developed countries owe it to efficient infrastructure and policy synergy, while developing countries depend on community-centered initiatives and global partnerships to offset disparities. The study concludes by underlining requirements for contextualized, inclusive, technological and inter-regional approaches to addressing digital divide. Such ideas are to serve as a base for further endeavors in creating equitable digital environment all around the world.

Keywords: Digital Literacy, Digital Divide, Global Collaboration, Inclusive Education, Emerging ICT, Socio-Economic Barriers.

1. Introduction

Digital literacy as a medium is one of the key competencies in contemporary global society encompassing the competence to use media technologies skillfully in finding, assessing and creating digital material (Baro, Obaro et al. 2019). Digital competencies are significant to achieve personal and professional growth as well as social participation and economical engagement (Falloon 2020). According to Wei (2022) digital literacy represents not only technical competence, but also critical, creative thinking, as well as ability to work in ever-shifting digital contexts (Wei, 2022). In this regard, the global digital divide becomes a serious problem – and it is most evident between the first and the third world countries (Lythreatis, Singh et al. 2022). While developed countries generally have well-developed information and communications technology (ICT) environment and high levels of students' computer and information literacy, developing countries encounter number of challenges, including lack of ICT devices, poor educational resources, and socio-economic inequalities (International Computer and Information Literacy Study, 2024).

Some of the indicators include: ability to access the Internet and educational performance connected to digital literacy (Abbas, Hussain et al. 2019). For instance, according to the study of International Computer and Information Literacy Study in 2024, 43 percent of the 14-year Europe Union students are not able to perform basic digital skill, and students belonging to low-income families performs even poorer than other students. Consequently, this highlights the necessity of the need to develop special push towards improving digital skills in various settings (International Computer and Information Literacy Study, 2024).

The purpose of this study is to identify and analyze international efforts toward enhancing digital literacy, around infrastructures, policies, educational approaches, social factors and trends. Therefore, the current study seeks to use a narrative review approach that integrates

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both qualitative findings and comparison. The information for this approach is derived from various sources such as; peer-reviewed articles, reports, and published cases.

This study aims to narrow down the gap of poor adoption of online technologies by recommending specific strategies deduced from the body of knowledge to aid future containment of the phenomenon of poor digital literacy. As discussed in the World Digital Competitiveness Ranking (2024), there is a need to know the opportunities and threats that prevailed in different economies to enable an integration of digital technologies for the benefit of all (World Digital Competitiveness Ranking, 2024). Collectively, this research adds to the over Arming literature review on the state of digital literacy with key recommendations of its impact on equity and development. This narrative review explored the recent studies on the initiatives that have been made in relation to increasing digital literacy in the developed and developing countries. The method used is aimed at capturing a general picture of the state of affairs regarding digital literacy with reference to prevalent themes, concerns, and approaches revealed in the course of the most recent studies.

2. Methodology

2.1 Literature Search Strategy

As stated earlier in the methodological consistency of the review, the starting point of measuring and comparing the level of digital literacy was a systematic bibliographic analysis of the identified keywords, namely "digital literacy," "digital skills," "digital competence," or "digital inclusion." The search was carried out on a number of academic databases: Google Scholar, Web of Science, Scopus, ProQuest with an emphasis on publications between the years 2018-2024. Specifically, this period was chosen to capture the latest changes in digital literacy and the need for digital skills resulting from COVID-19 (Helsper & Eynon, 2019).

1.1 Inclusion and Exclusion Criteria

In order to conduct a structured and targeted review, more specific inclusion and exclusion criteria were adopted. From the identified articles, original and peer reviewed articles, reports, and case studies were selected as source of information regarding developed and developing country digital literacy interventions. Analyzed articles were selected if they were published in English in order to keep the working understanding consistent. Articles which were not peer reviewed, editorials, and research that made use of opinions as well as studies that did not employ empirical evidence or well-articulated methodological designs were eliminated.

1.2 Data Extraction and Thematic Analysis

After the literature search, articles were also reviewed to identify major themes related to digital literacy initiatives. Exploratory research with a conceptual qualitative focus was used to find themes common in the selected literature. This entailed firstly, going through each of the articles thoroughly and categorizing the obtained data under broad headings including infrastructures/ accessibility, government policies/ strategies, educational interventions, cultural factors, funding patterns and trends (Braun & Clarke, 2006).

Table I List of Reviewed Digital Literacy Studies

Study Reference	Region/Context	Focus/Key Findings	Identified Gaps
Helsper & Eynon (2019)	Global	Conceptual framework for addressing digital inequality, highlighting access and skills disparities.	Lack of empirical data tracking long-term outcomes of digital literacy programs.
Choudhary & Bansal (2022)	Marginalized Populations	Systematic review of digital literacy training programs (DLTPs) targeting marginalized groups.	Short-term focus without longitudinal studies; limited exploration of cultural and linguistic barriers.
International Computer and Information Literacy Study (2024)	Europe	Assessment of digital skills among students, noting low proficiency among low-income families.	Limited to Europe; no cross-regional comparisons or inclusion of diverse socio-economic factors globally.

Study Reference	Region/Context	Focus/Key Findings	Identified Gaps
UNESCO (2023)	South Asia	Empowering women in ICT through initiatives like "Women in Technology."	Limited exploration of challenges specific to ethnic minorities and rural populations.
Ajira Digital Program (2024)	Kenya	Training youth for online work opportunities to increase employment through community-centered initiatives.	Limited scalability and adaptation for other developing regions.
Google (2024)	Global	"Grow with Google" initiative offering free training materials for workplace skills development.	Focused on developed regions; limited engagement with low-resource settings in developing countries.
Kumpulainen et al. (2023)	Finland	Comprehensive digital education plan integrating ICT management into school systems.	Lack of adaptation models for use in less resource-intensive contexts.
GSMA (2023)	Sub-Saharan Africa	Mobile-first approach to Internet access; over 50% use mobile networks.	Cost barriers to access mobile data and devices; limited strategies to address affordability issues.
Schofield et al. (2023)	Developed Countries	Emphasis on advanced competencies like AI and cybersecurity.	Lack of frameworks for transferring advanced skills training to underdeveloped regions.
Reyes & Avello (2021)	Developing Countries	Highlighted community-based learning as essential for digital inclusion.	Insufficient exploration of institutional roles in scaling initiatives.
European Commission (2022)	European Union	Policies on digital skills and employability through partnerships and digital coalitions.	Limited focus on socio-economic inclusion within EU digital literacy policies.
Government of India (2023)	India	Vision of "Digital India" to bridge the digital divide through universal Internet access and enhanced aptitude.	Gaps in monitoring and evaluating outcomes of initiatives across diverse regions in India.
UNESCO (2022)	Global	International cooperation for digital literacy, including projects in underserved regions.	Limited inclusion of localized cultural and linguistic adaptations in program design.
Kawasaki (2023)	Japan	Tech-centric education system integrating digital literacy at early education levels.	Lack of applicability for non-tech-centric societies.
World Bank (2024)	Developing Countries	Insights into infrastructure and accessibility challenges, with recommendations for bridging gaps.	Limited focus on sustainable funding models for digital literacy in low-income regions.

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Study Reference	Region/Context	Focus/Key Findings	Identified Gaps
OECD (2023)	Nordic Countries	Comprehensive broadband Internet access enabling digital inclusion.	Limited focus on best practices transferable to regions with weaker infrastructure.
PMC (2023)	South Pacific	Scalable regional frameworks for digital literacy adaptation.	Limited data on scalability beyond the South Pacific context.

1.3 Synthesis of Findings

The results of the thematic analysis were integrated into a logical story that describes how developed and developing states have approached the improvement of digital literacy. This synthesis was meant to offer suggestions of successful practices and directions for development for global Digital Literacy projects.

1.4 Limitations

Despite these findings, it is important to note some limitations in this mode of drawing together the international narrative review on digital literacy efforts. The use of published work may also bring with it the convoy effect, as only the studies that have positive or significant results were usually published (Dickersin & Min, 1993). Also, concentrating on the articles in English may lead to the inclusion of the narrow spectrum.

3. Discussion

Different studies of digital literacy initiatives of the two categories of countries show disparities in the infrastructures, government policies, and education programs between the developed and the developing countries.

3.1 Infrastructure and Accessibility

As for the infrastructure and access, the developed countries have opened wide accessibility of internet and other faster technologies like 5G and artificial intelligence AI. For example, nations in the Nordic region are well-equipped with broadband internet connectivity indicating near absolute accessibility of high-speed internet essential for holistic e-embrace and e-competency (OECD, 2023). On the other hand, challenges associated to restricted access to constant, dependable internet and technology remain paramount in improving nations. Some parts of the world, especially in Sub-Saharan Africa, use a mobile-first approach because most individuals use mobile devices for browsing the Internet. Sources also show that the mobile internet usage has increased in these regions and currently more than 50% of these populations are using mobile networks for Internet connection (GSMA, 2023). However, access has a key cost issue, whereby people cannot afford the required data bundles or gadgets to interact with various digital materials (World Bank, 2024).

3.2 Government Policies and Initiatives

It was identified that government policies and other activities are a critical component of the development of digital literacy. In developed countries, moreover, acquisition and incorporation of digital literacy into education as well as workforce policies remain closely linked. The European Union is a good example of an approach towards digital skills and employability across all areas of practice through such partnerships and cooperation to improve workforce for new occupational requirements through Digital Skills and Jobs Coalition (European Commission, 2022). On the other hand, developing countries have to wait for their national programs and organize some collaborations so as to minimize the digital gap. For instance, India has a Digital India program whereby this country's ultimate vision is to bridge the digital divide between the Indian people and make India a digitally empowered nation through establishing universal internet connection and enhancing the aptitude level of its citizens in matters concerning digital infrastructure (Government of India, 2023).

3.3 Education and Capacity Building

In a case of education and capacity building, developed countries often have defined programs of teaching the management of ICTs within the school system. Finland for instance provides a cohesive digital education plan that incorporates digital literacy with the subject area for students in preparation for the digital market (Kumpulainen et al., 2023). On the other hand, the developing nations try to offer the grassroots and community-based learning programs to improve the digital

learning. The Kenya's Ajira Digital platform shows this by offering training to the youth in skills needed for the online work opportunities (Ajira Digital Program, 2024). They are indispensable for making as many community members as possible equipped with the relevant knowledge and experience in the sphere.

3.4 Cultural and Societal Influences

A few concerns in cultural and societal aspect of the developed countries include; strong culture of innovation and trust in technology. For instance, the education system in Japan has adopted techno centric model of learning as a way of inscribing a culture that embraces learning ability of technology at earlier ages (Kawasaki, 2023). This cultural acceptance leads to a higher digital literacy of the populations when it comes to use of inventions in the future. On the other hand, the society in the developing countries presents major challenges to adoption of digital literacy. Such as gender problems and linguistic barriers which due to hinder the equitable use of digital education. Efforts to empower women in information communication technology (ICT) in South Asia provided colors of these disparities. Such activities such as "Women in Technology" endeavor have helped the women to be trained and supported for the purposes of creating a meaningful engagement in the society and in the digital world (UNESCO, 2023).

2.5 Funding and Partnerships

Funding and partnership are therefore important factors in determining digital literacy programs. In the developed countries, the PPPs are common, and computer industry support is tremendously high. Such initiative as "Grow with Google" can be presented as an example of the modern trend as Google provides free training materials and tools to improve digital literacy and workplace demanded skills (Google, 2024). They not only improve certain capacities but also boost the economic development by arming the workforce. On the other hand, most of the developing countries depend on international donations and non-profit organizations' contributions to fund the development of digital literacy. For example, UNESCO's numerous digital literacy initiatives include improving educational opportunities in technology in various parts of the world; the projects reveal how international cooperation can solve local problems (UNESCO United Nations Educational, Scientific and Cultural Organization, 2022).

2.6 Emerging Trends and Challenges

Other current trends and issues also define the developments of digital literacy initiatives. In developed countries, advanced and specialized key competencies include cybersecurity, artificial intelligence and digital citizenship. These competencies are progressively absorbing much-needed entities toward troubleshooting the havoc of the contemporary internet epoch (Schofield et al., 2023). But modernization issues of undeveloped countries include: infrastructural weaknesses and issues in education that hinder progress. Solving these problems implies the use of unique solutions and solutions on the local level that are based on the opportunities of the community and at the same time ensuring the integration of training programs for lesions (Reyes & Avello, 2021).

2. Comparative Analysis

A comparison of the digital literacy initiatives shows that there are several similarities although the level of development of the initiatives may vary between developed and developing countries. Knowledge of such matters is vital to handling the issue of the digital divide in various global regions and developing the right approach to improve people's digital skills. The central topic of interest for both developed and developing states is minimization of the digital divide. This convergence of interests stems from the conviction that digital literacy is critical for development, especially economic, as well as social procurement and individual emancipation. Efforts to reduce or overcome digital divide, both geographically and socially, are rising more and more in national policies around the world. For example, most governments irrespective of the status of their country's development are already designing policies that would improve inclusion and use of technology and skills learning, mainly recognizing that effective availability of digitization tools and resources is essential for a sustainable economy (UNICEF, 2023; Giga, 2024).

Furthermore, there is a rise on the use of partnership to extend the reach of digital literacy. In the developed world, therefore, partnerships between the government and private sector are used to developed the infrastructure within schools and available training facilities. For example, the initiatives, such as the Grow with Google program, show that the cooperation between the government and companies can solve the problem of the shortfall of skills (Google, 2024). As for the Developing Nations, they are also entering into partnership with

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other international organizations and NGOs with regards to their digital literacy programs. From their respective regions, UNESCO's projects are focused on providing the means and knowledge needed in promotion of high digital literacy of populations that have low access and knowledge towards using such technologies (UNESCO, 2022). These collaborations demonstrate an appreciation of the need for cooperation in the development of solutions to the difficulties surrounding digital competency.

However, there are several distinctions between developed and developing countries for resources and policies. From the perspective of resources, there exists well-established infrastructure, and financial capital in developed countries, which ensures the spread of technology. Internet connectivity has become widespread in many developed nations including fast broadband internet connection that facilitates total connectivity (OECD, 2023). On the other hand, most of the developing countries experience challenging infrastructure gaps and constraints of funds, accessibility to proper internet and technology. According to various sources, low-income countries have been observed to have very low levels of digital literacy as a result of these constraints (Giga, 2024). For instance, only 36% of populations in landlocked developing countries use the internet in 2022 while the global usage stands at 66% (UNGA, 2023).

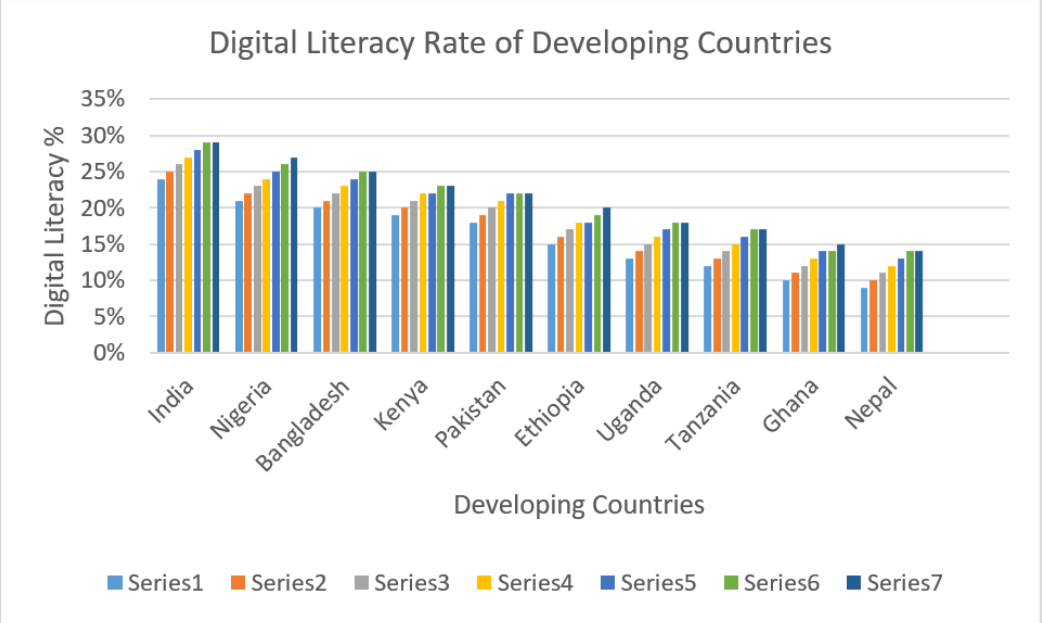
As for policy priorities, it is worth pointing out that the focus of materials that constitute the educational systems of developed countries is often shifted toward innovation and effective digital competencies. The educational public policies sometimes focus on including the latest technologies like AI and cyber security into the curriculum (Schofield et al., 2023). On the other hand, developing countries mostly focus on the basic skills that should be met for the development of fundamental digital competence. For instance, most of the programs in these areas are designed to prepare the people for the fundamental application of internet or simple software (Coiro, 2017). The focus on the lower levels of competencies is based on the concern for developing a sound prerequisite upon which a person can advance to higher levels of proficiency.

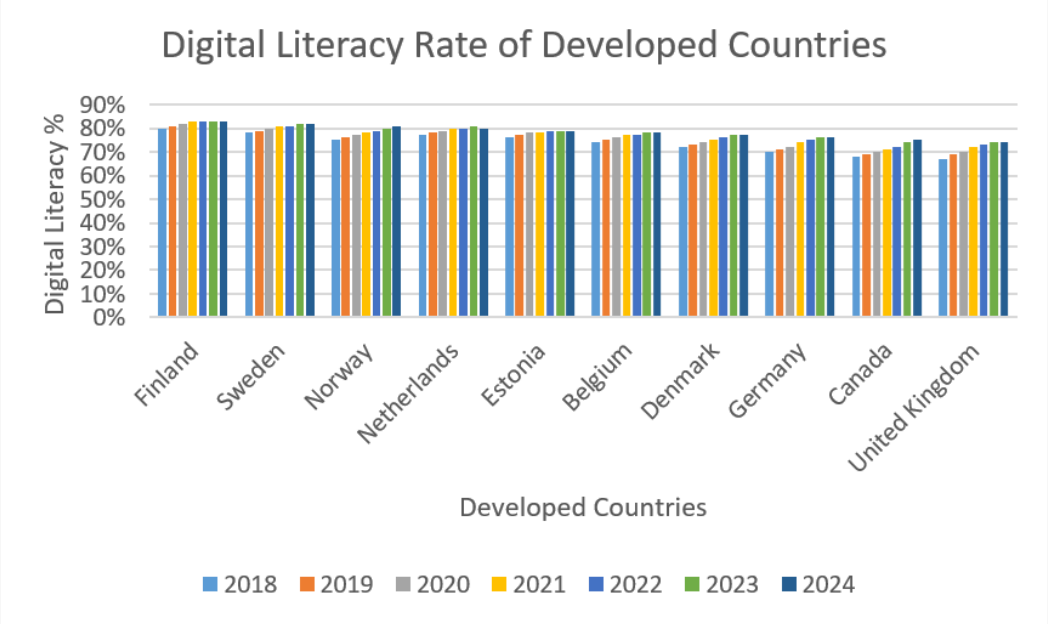
Table II Literacy Rate of Ten Developed and Developing Countries

Country	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Developed Countries							
Finland	80%	81%	82%	83%	83%	83%	83%
Sweden	78%	79%	80%	81%	81%	82%	82%
Norway	75%	76%	77%	78%	79%	80%	81%
Netherlands	77%	78%	79%	80%	80%	81%	80%
Estonia	76%	77%	78%	78%	79%	79%	79%
Belgium	74%	75%	76%	77%	77%	78%	78%
Denmark	72%	73%	74%	75%	76%	77%	77%
Germany	70%	71%	72%	74%	75%	76%	76%
Canada	68%	69%	70%	71%	72%	74%	75%
United Kingdom	67%	69%	70%	72%	73%	74%	74%
Developing Countries							
India	24%	25%	26%	27%	28%	29%	29%
Nigeria	21%	22%	23%	24%	25%	26%	27%
Bangladesh	20%	21%	22%	23%	24%	25%	25%
Kenya	19%	20%	21%	22%	22%	23%	23%
Pakistan	18%	19%	20%	21%	22%	22%	22%
Ethiopia	15%	16%	17%	18%	18%	19%	20%
Uganda	13%	14%	15%	16%	17%	18%	18%

Country	2018	2019	2020	2021	2022	2023	2024
Tanzania	12%	13%	14%	15%	16%	17%	17%
Ghana	10%	11%	12%	13%	14%	14%	15%
Nepal	9%	10%	11%	12%	13%	14%	14%

Source: Eurostat, 2023 (ec.europa.eu), GIGA Hamburg, 2023 (giga-hamburg.de)





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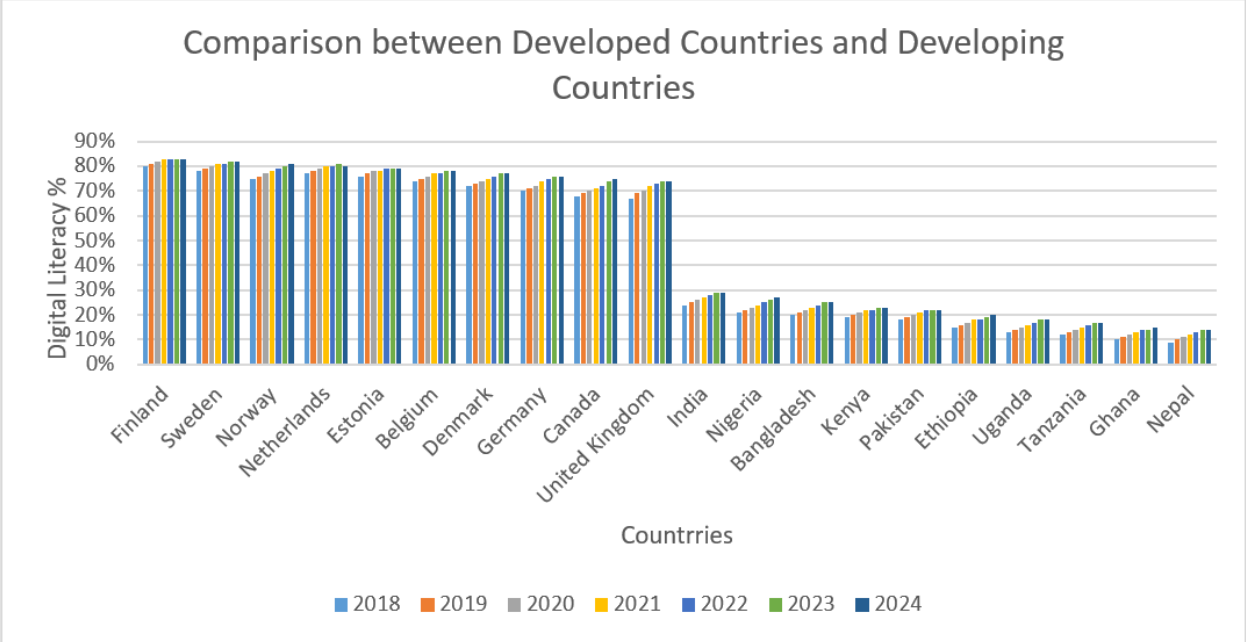

3. Potential Gaps

The review of existing literature on digital literacy initiatives reveals several critical research gaps that warrant further investigation. One significant gap is the lack of longitudinal studies comparing digital literacy outcomes across different regions. While some studies, such as those by Choudhary and Bansal (2022), provide insights into the effectiveness of digital literacy training programs (DLTPs) for marginalized populations, they often focus on short-term outcomes without tracking the sustained impacts over time (Choudhary & Bansal, 2022). This absence of longitudinal data limits our understanding of how digital literacy skills evolve and influence socio-economic mobility over extended periods.

Another notable gap is the limited research on marginalized groups and their access to digital literacy resources. Although studies highlight the importance of digital literacy for social inclusion, many fail to adequately address the specific barriers faced by marginalized communities, such as women, ethnic minorities, and individuals with disabilities. For instance, the systematic review by Choudhary and Bansal (2022) emphasizes the need for targeted DLTPs but does not delve deeply into the unique challenges encountered by these groups (Choudhary & Bansal, 2022). Furthermore, Gurstein (2011) points out that socio-cultural factors like language barriers and gender disparities significantly hinder access to digital technologies, yet these aspects remain underexplored in many initiatives.

Additionally, there is an insufficient exploration of cultural and linguistic barriers in global digital literacy programs. Many existing frameworks do not adequately consider how cultural contexts influence the effectiveness of digital literacy training. The study by Selwyn (2012) discusses technology integration in marginalized communities but fails to address how cultural relevance can enhance program effectiveness (Selwyn, 2012). This oversight suggests a need for more culturally sensitive approaches that resonate with diverse populations.

Finally, there is a pressing need for scalable frameworks that are adaptable to various regional contexts. While some frameworks exist, such as the South Pacific Digital Literacy Framework proposed by a recent study (PMC, 2023), they often lack the flexibility required to be effectively implemented in different cultural or economic environments (PMC, 2023). As highlighted in multiple studies, including those by Ragnedda and Muschert (2013), developing adaptable models that can cater to diverse community needs is essential for creating impactful digital literacy initiatives.

4. Recommendations and Future Directions

4.1 Contextualized Approaches

Digital literacy can only be addressed when the program is extended to all areas of the demographics taking into account the regional and cultural differences.

The programs must reflect the socio economic and technological environments of the regions they seek to serve and the comparative advantage of the instruction delivery methods (Reyes & Avello, 2021). For example, including local training materials and community involvement may ensure the formulation of innovation to meet the digital requirements of the disadvantaged societies in the developing world. In this way, contextualization allows stakeholders to increase engagement and participation amongst other people (Selwyn, 2012).

4.2 Cross-Regional Collaboration

Digital literacy is one area where global partnerships are essential in the creation of solutions. Development cooperation between developed and developing countries can help in the sharing of information and experiences and resources (UNESCO, 2022). Such partnerships should be aimed at offering the technology support, manpower and financial resources to strengthen underprivileged areas. Inter-sectoral interventions can also contribute to the replication of effective interventions by taking advantage of the positive attributes of both high-income and low-and middle-income countries to respond to similar threats (GSMA, 2023).

4.3 Inclusive Strategies

Digital literacy programs should be aware of the gender digital divide, the difference between rural and urban dwellers and differences in languages. Some initiatives should be encouraging to bring diverse people in, for example women, people of color or people with disabilities (UNESCO, 2023). Because the members of the targeted groups can therefore gain necessary skills to participate in the digital society, such programs can make the social inclusion of disadvantaged people possible. Particularly, outreach, engagement, and culturally appropriate practices are seen as important in programs addressing digital inclusion (Gurstein, 2011).

4.4 Technological Innovations

Social media type applications can open up innovative prospects for digital literacy schemes. It is obvious that techniques such as AI, low-cost devices and mobile-based solution can support cost efficient and large-scale initiatives in areas where resources could be limited (Schofield et al., 2023). The benefits that may accrue in enhancing the impact of these programs include the enhancement of localized digital tools to support the needs of the community. Innovation should also strive to help close infrastructural disparities and ensure people of all economic classes have access to technology (PMC forthcoming).

4.5 Policy Suggestions

To enhance the sustainability of the digital literacy programs, policymakers ought to factor ICILS 2024 when designing global standards for the assessment of results. These standards would help to establish the worldwide standards for measuring the effectiveness of such programs. Furthermore, mainstreaming of digital literacy into national education systems together with workforce development initiatives will help to standardize the practice thus producing a digitally literate society. (World Digital Competitiveness Ranking, Year 2024) For the issues that need to be addressed in the digital ecosystem to be sustainable and fair, EU policymakers need to direct more of their investment towards education and technology (European Commission, 2022)

4.6 Longitudinal Research and Monitoring

Longitudinal studies are required to determine how digital literacy projects that are implemented may continue to affect socio-economic mobility in the long run. Longitudinal research can give understanding about the change in the digital skills and their contributions to the improvement of people and the society (Choudhary & Bansal, 2022). Such utilization of monitoring and recognitions with evidence basis can assist in the adjustment of the strategies; these are in light that new issues in computer illiteracy can be caught much earlier and effectively tackled (Dickersin & Min, 1993). Such positive and sustainable results mean that stakeholders can craft flexible and effective digital literacy initiatives when seeking and addressing measurable outcomes.

5. Conclusion

Digital literacy is one of the standards of growth and equality in the society; however, the divide that exists in the developed and the developing world still exists. Explicitly adopting a constructivist epistemology and relativist ontology, this study highlights the need for special and comprehensive remedies in this regard. It provides examples of differences in infrastructures; policies to address digital literacy issues; and strategies for

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implementation of educational interventions, illustrating that Digital literacy issues, as well as the solutions, are social constructs embedded in specific contexts. While developed countries are focused on higher-level competencies in digitization and novel technologies, development areas face basic issues that need solutions that are both efficient and affordable. Such inequalities require collective actions, effective policies and localized measures of addressing the issue. Prioritizing availability and accessibility of technology, supporting collaboration among regions, the world can enhance the process of pushing digital literacy as the shuttle between the voices of all marginalized groups. Digital interconnectivity requires stakeholders who will make the necessary interventions to ensure that anyone can embrace the digital shift.

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