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Leveraging technology for equity: A literature review on e-inclusion and its potential to advance young people's socioeconomic inclusion

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Abstract: This literature review investigates the role of e-inclusion initiatives in promoting socioeconomic inclusion for young people, focusing on effective technology leveraging. It addresses how e-inclusion initiatives can advance youth socioeconomic inclusion and identifies key success factors. The review analyzes peer-reviewed articles, policy reports, and case studies to synthesize current knowledge on e-inclusion strategies, implementation, and outcomes. Findings reveal that successful e-inclusion initiatives extend beyond providing technological access, incorporating digital literacy education, culturally sensitive design, and integration with broader socioeconomic support systems. Key success factors include tailored community-specific approaches, sustained engagement, relevant digital skill development, and multi-stakeholder collaboration. Challenges such as rapidly evolving technology, persistent socioeconomic barriers, and the need for long-term impact assessment are highlighted. The study explores various e-inclusion dimensions, including hardware/software access, internet connectivity, digital competencies, and online safety, examining their intersection with traditional socioeconomic indicators. It also considers policy implications and integration into national digital strategies and educational curricula. By analyzing global case studies, the review identifies best practices and lessons learned. It contributes to digital inclusion literature by providing a comprehensive overview of current practices and identifying research gaps. The study concludes by proposing a framework for future initiatives and suggesting further research directions to enhance technology-driven approaches in advancing youth socioeconomic inclusion. It emphasizes the need for interdisciplinary approaches to develop holistic and sustainable e-inclusion strategies.

Keywords: E-inclusion; Digital divide; Social equity; Youth empowerment; Socioeconomic inclusion.

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1 Introduction

The digital revolution has transformed nearly every aspect of modern society, offering unprecedented opportunities for connectivity, education, and economic participation. However, the persistence of the digital

divide continues to pose significant challenges to socioeconomic inclusion, particularly for young people from marginalized backgrounds.

E-inclusion encompasses policies and initiatives aimed at reducing digital exclusion and ensuring that all members of society can access and benefit from information and communication technologies (ICTs) (Van Dijk, 2006). As Warschauer (2004) emphasizes, true e-inclusion goes beyond mere access to technology, encompassing the ability to leverage digital tools for personal empowerment and societal engagement. This review explores the multifaceted nature of e-inclusion, including access to digital devices and internet connectivity, digital literacy and skills development, and the meaningful use of technology for social and economic participation.

Despite significant progress in expanding digital access globally, research continues to document persistent disparities along socioeconomic, geographic, and demographic lines. Urban-rural divides remain pronounced in many countries (Philip et al., 2017), while lower-income youth often struggle with unreliable internet access (Gonzales, 2016). Moreover, gender gaps in mobile ownership and internet use persist in certain regions (GSMA, 2020). Beyond access, researchers have identified critical gaps in digital skills and meaningful technology use, with socioeconomic background influencing the development of advanced digital competencies (van Deursen & van Dijk, 2014).

As societies grapple with growing inequality and the rapid pace of technological change, understanding the potential and limitations of e-inclusion strategies is crucial for policymakers, educators, and technology developers. This review seeks to inform evidence-based approaches to harnessing digital technologies for more equitable outcomes among youth, ultimately contributing to a more inclusive and prosperous digital future for all.

This review examines various e-inclusion initiatives targeting youth, including school-based device programs, community technology centers, and mobile-first approaches in developing contexts. We explore models for digital skills development and assess technology-enabled interventions aimed at supporting broader inclusion goals, such as online tutoring, job matching platforms, and financial literacy apps.

The central research questions of this review are: How can e-inclusion initiatives effectively leverage technology to advance socioeconomic inclusion for young people and what are the key factors influencing their success?

By synthesizing current research on the impacts of e-inclusion efforts, this review aims to provide a comprehensive understanding of how technology can be leveraged to advance young people's socioeconomic inclusion. We consider educational outcomes, economic opportunities, and broader social inclusion benefits, while also addressing challenges and critiques raised by scholars in the field.

This literature review follows a structured approach to examine e-inclusion and its potential to advance young people's socioeconomic inclusion. We begin by defining e-inclusion and its key dimensions, followed by an analysis of the digital divide as it affects youth, focusing on access disparities and skills gaps. The review then explores various e-inclusion initiatives targeting young people, including efforts to expand access, develop digital skills, and implement technology-enabled interventions. Finally, we address challenges and critiques associated with e-inclusion efforts.

2 Methodology

This literature review aims to synthesize and critically analyze existing research on leveraging technology for equity, with a focus on e-inclusion and its potential to advance young people's socioeconomic inclusion. The review process began with a broad search of academic databases including Web of Science, Scopus, ERIC, and Google Scholar. Key search terms encompassed "e-inclusion," "digital inclusion," "ICT," "youth," "young people," "socioeconomic inclusion," and "social equity." To capture a comprehensive view of the field's development, we did not set strict date limitations but focused primarily on literature from the past decade.

The selection of literature was based on relevance to the review's objectives and potential to contribute meaningful insights, rather than adhering to rigid inclusion criteria. This approach allowed us to consider a diverse range of sources, including peer-reviewed articles, books, policy reports, and conference proceedings. We prioritized seminal works, frequently cited studies, and recent publications that offered novel perspectives or findings.

Each selected work underwent critical reading and analysis, with particular attention paid to theoretical frameworks, methodologies employed in empirical studies, key findings related to youth socioeconomic inclusion, identified challenges and opportunities in leveraging technology for equity, and policy implications. As we reviewed the literature, we identified recurring themes and organized our findings accordingly, allowing us to structure the review around key concepts and debates in the field of e-inclusion and youth socioeconomic inclusion.

The synthesis process involved drawing connections between different studies and identifying areas of consensus and controversy. We interpreted the collective body of literature to draw meaningful conclusions about the state of knowledge in the field. Throughout the review, we remained attentive to gaps in the existing literature, noting areas where further research is needed.

We developed a coherent narrative that presents a comprehensive overview of the topic, integrating various perspectives and findings from the literature. This narrative aims to provide readers with a nuanced understanding of how technology can be leveraged for equity in youth socioeconomic inclusion.

This literature review methodology allows for a flexible and comprehensive exploration of the topic, enabling us to present a holistic view of the current state of knowledge on e-inclusion and its potential to advance young people's socioeconomic inclusion.

3 Defining e-inclusion

3.1 Conceptual framework

Several researchers have explored and defined the concept of e-inclusion, resulting in a variety of interpretations that reflect different perspectives and approaches. The evolution of this concept can be traced through the diverse definitions proposed by various authors over time. To illustrate this progression, we can examine a chronological overview of e-inclusion definitions:

Table 1. The evolving concept of e-inclusion

Source	Definition	Key Focus
European Commission (2006)	Active engagement of individuals and communities in all aspects of the knowledge-based society and economy through their access to information and communication technologies (ICT).	Comprehensive participation in knowledge society
Warschauer (2003)	The capacity of individuals and groups to access and utilize information and communication technologies (ICTs) for full participation in the digital society.	Access, use, and participation
Kaplan (2005)	The use of digital technologies to bring marginalized people and communities into the mainstream of the information society.	Integration of marginalized groups
Van Dijk (2005)	The process of ensuring that disadvantaged people and communities have the skills, opportunities, and access required to benefit fully from the information society.	Skills, opportunities, and access for disadvantaged groups
Selwyn and Facer (2007)	The use of technology to promote inclusion and reduce digital divides in society.	Reducing digital divides

Council of Europe (2009)	The realization of a citizen's right to participate fully in the information society, regardless of individual or social disadvantages.	Rights-based approach
Heeks (2010)	The extension of ICT benefits to marginalized individuals and communities to foster socio-economic development and reduce digital inequalities.	Socio-economic development and inequality reduction

The definitions of e-inclusion vary significantly across different sources, reflecting the concept's complexity and multifaceted nature. Key differences emerge in their scope (individual vs. community focus), target groups (specific marginalized populations vs. general society), objectives (from digital participation to socio-economic development), approaches (rights-based, technological, or process-oriented), and areas of emphasis (access, skills, or broader societal impacts). These variations highlight how e-inclusion has been interpreted and applied differently across various fields, contexts, and time periods, demonstrating its evolution as a concept in response to changing technological and social landscapes.

3.2 Dimensions of e-inclusion

The concept of e-inclusion encompasses a multifaceted approach to ensuring equitable participation in the digital age. At its core, e-inclusion entails the ability to access and effectively use information and communication technologies (ICTs), as emphasized by Warschauer (2003) and Van Dijk (2005). The European Commission (2006) builds on this foundational aspect by highlighting the importance of comprehensive participation across all dimensions of the knowledge-based society and economy.

A key focus of e-inclusion is the integration of marginalized groups into the digital mainstream. Kaplan (2005) and Heeks (2010) stress the importance of bringing disadvantaged individuals and communities into the fold of the information society. This integration is not merely about physical access to technology, but also about developing the necessary skills and providing opportunities for meaningful participation, as noted by Van Dijk (2005).

The concept also encompasses broader societal goals. Selwyn and Facer (2007) and Heeks (2010) emphasize the role of e-inclusion in reducing digital divides and promoting overall social inclusion. This perspective is further reinforced by the Council of Europe (2009), which frames participation in the information society as a fundamental citizen's right, regardless of individual or social disadvantages.

Lastly, e-inclusion is viewed as a catalyst for socio-economic development. Heeks (2010) highlights the potential of ICTs to foster development and reduce digital inequalities, underscoring the transformative power of technology when it is made accessible and inclusive to all members of society.

The table below summarizes the key dimensions of e-inclusion, highlighting the essential aspects and contributions of various scholars and organizations to this evolving concept.

Table 2. The key dimensions of e-inclusion

Dimension	Description	References
Access to ICTs	Ability to access and effectively use information and communication technologies.	Warschauer (2003), Van Dijk (2005)
Comprehensive Participation	Significance of engaging in all aspects of the knowledge-based society and economy.	European Commission (2006)
Integration of Marginalized Groups	Bringing disadvantaged individuals and communities into the digital mainstream, developing skills and opportunities for meaningful participation.	Kaplan (2005), Heeks (2010), Van Dijk (2005)

Social Inclusion	Reducing digital divides and promoting overall social inclusion, participation as a fundamental right.	Selwyn and Facer (2007), Heeks (2010), Council of Europe (2009)
Socio-Economic Development	Potential of ICTs to foster development and reduce digital inequalities.	Heeks (2010)

In summary, e-inclusion represents a comprehensive approach to digital participation, encompassing access, skills, integration, rights, and socio-economic development. It reflects the evolving understanding of technology's role in society and the importance of ensuring that all individuals can fully participate in and benefit from the digital age.

4 The digital divide and youth

4.1 Dimensions of e-inclusion

E-inclusion initiatives aimed at bridging the digital divide continue to face significant challenges, particularly in developing countries. Studies consistently document persistent disparities in digital access along socioeconomic, geographic, and demographic lines. These disparities manifest in several key areas: First, a notable urban-rural divide persists, with rural areas often lagging behind in terms of digital infrastructure and connectivity. Second, lower-income youth frequently face barriers to reliable internet access and quality devices, potentially limiting their educational and economic opportunities. Third, gender gaps in mobile ownership and internet use remain pronounced in many regions.

4.1.1 Urban-rural divide

The urban-rural digital divide remains a significant challenge in many countries, affecting various aspects of life including education, economic opportunities, and access to information. This disparity is characterized by differences in internet infrastructure, connectivity speeds, and overall digital access between urban and rural areas.

Philip et al. (2017) conducted an extensive study on the urban-rural digital divide in the United States. Their research highlighted that rural areas consistently lag behind urban centers in terms of broadband availability and adoption. They found that while 97% of urban Americans had access to high-speed fixed service, only 65% of rural residents had similar access. This study emphasized how the lack of adequate digital infrastructure in rural areas can lead to diminished opportunities for rural residents.

Another significant study by Salemink et al. (2017) reviewed 157 papers on the rural digital divide published between 2000 and 2015. They concluded that rural areas are constantly trailing in the digital adaptation process, creating a cyclical problem where the lack of digital infrastructure leads to lower adoption rates, which in turn discourages further infrastructure investments.

In the European context, de Clercq et al. (2023) analyzed the urban-rural digital divide across EU countries. They found that while the gap in basic internet access has narrowed disparities in the quality and speed of connections persist, potentially hindering the ability of rural areas to fully participate in the digital economy.

These studies underscore the persistence of the urban-rural digital divide and its potential to exacerbate existing socioeconomic inequalities. They highlight the need for targeted policies and investments to bridge this gap and ensure more equitable access to digital resources across geographic locations.

4.1.2 Lower-income youth

The issue of income-based digital inequality among youth is a significant concern. Various studies have highlighted how socioeconomic status can significantly impact a young person's ability to access and effectively use digital technologies.

Gonzales (2016) conducted a seminal study on this topic, focusing on the concept of "technology maintenance" among low-income youth. The research found that lower-income youth frequently experienced disruptions in their internet connectivity due to financial constraints. These disruptions, often caused by unpaid bills or the

need to prioritize other expenses, led to what Gonzales termed "dependable instability" in their digital access. This instability had cascading effects on their ability to complete schoolwork, maintain social connections, and access online resources.

Campos-Castillo (2015) examined how income-based disparities in internet access affect educational outcomes. The study found that lower-income students with inconsistent internet access at home were at a significant disadvantage in terms of academic performance and digital skill development.

Reich and Ito (2017) conducted extensive research on digital inequality among youth in the United States. Their work emphasized that while access to basic internet and devices has improved, significant gaps remain in the quality and consistency of that access. They noted that lower-income youth often have to share devices with family members or rely on public Wi-Fi, which can limit their ability to engage in more complex or time-intensive online activities.

More recently, a study by Katz and Rideout (2021) examined the digital experiences of low-income families during the COVID-19 pandemic. They found that many lower-income youth relied heavily on smartphones for internet access, which limited their ability to engage in remote learning effectively. The study highlighted how the lack of reliable broadband and suitable devices exacerbated educational inequalities during periods of online schooling.

These studies collectively underscore the complex relationship between income levels and digital access among youth. This research emphasizes the need for targeted interventions to ensure that lower-income youth have the stable, high-quality internet access necessary for full participation in an increasingly digital world.

4.1.3 Gender gaps in mobile ownership

The gender digital divide remains a persistent issue in many parts of the world, with women and girls often having less access to mobile devices and the internet compared to their male counterparts. This disparity has far-reaching implications for education, economic opportunities, and social empowerment.

The GSMA, global organization representing mobile network operators, has been at the forefront of researching this issue. Their 2020 Mobile Gender Gap Report provided comprehensive data on gender disparities in mobile ownership and internet use across low- and middle-income countries. The report found that women were 8% less likely than men to own a mobile phone and 20% less likely to use mobile internet. These gaps were even more pronounced in certain regions, such as South Asia and Sub-Saharan Africa (GSMA, 2020).

Building on this, Sey (2021) conducted a systematic review of literature on gender and mobile phone ownership and use in the Global South. The study highlighted that while mobile phone ownership has increased overall, gender gaps persist due to various socio-economic and cultural factors. Sey emphasized that merely owning a phone doesn't guarantee equal usage, as women often face additional barriers in utilizing mobile technologies effectively.

A study by Rashid (2016) focused on the gender digital divide in rural Bangladesh. The research revealed significant disparities in mobile phone ownership and internet use between men and women, attributing these differences to factors such as lower literacy rates among women, cultural norms, and economic dependencies.

In the African context, Gillwald et al. (2018) conducted a comprehensive survey across several countries. Their findings showed that women were 15% less likely to own a mobile phone and 41% less likely to use the internet compared to men. The study highlighted how these disparities intersect with other forms of inequality, such as income and education levels.

Antonio and Tuffley (2014) examined the gender digital divide in developing countries, focusing on its impact on education and empowerment. They argued that increasing women's access to ICTs could have significant positive effects on economic development and social progress.

More recently, Rotondi et al. (2020) analyzed data from 209 countries over 23 years and found that mobile phone availability is associated with advancements in gender equality. However, they also noted that pre-existing gender inequalities can hinder women's access to these technologies, creating a cyclical problem.

These studies collectively highlight the complex nature of the gender digital divide. They demonstrate that while progress has been made in some areas, significant disparities persist, particularly in developing regions. The research emphasizes that addressing this divide requires a multifaceted approach that considers not just access to technology, but also socio-economic factors, cultural norms, and digital literacy.

4.2 Skills and usage gaps

4.2.1 The influence of socioeconomic background

The concept of digital skills and usage gaps refers to disparities in how effectively individuals can use digital technologies, even when they have access. Socioeconomic background plays a crucial role in shaping these disparities, often leading to significant differences in digital competencies and the ability to leverage technology for personal and professional advancement.

Van Dijk and van Deursen (2014) conducted seminal research on digital skills, proposing a comprehensive framework that includes operational, formal, information, communication, content creation, and strategic skills. Their work highlighted how individuals from higher socioeconomic backgrounds often possess more advanced digital skills across these categories, particularly in terms of information processing and strategic use of digital technologies.

Hargittai (2010) conducted a study on young adults' internet skills, finding significant variations based on socioeconomic status. The research revealed that students from more privileged backgrounds demonstrated higher levels of web-use skill, even when controlling for access and experience. This suggests that socioeconomic advantages translate into digital advantages, potentially reinforcing existing social inequalities.

Building on this, Scheerder et al. (2017) performed a systematic literature review on digital inequality, examining 110 core articles published between 2002 and 2015. They found consistent evidence that individuals with higher socioeconomic status not only have better access to digital technologies but also possess more advanced digital skills and engage in more diverse and beneficial online activities.

Focusing on adolescents, Livingstone and Helsper (2007) examined how social disadvantage influences young people's internet use. Their study revealed that while access gaps were narrowing, significant disparities remained in the quality of use. Socioeconomically advantaged youth were more likely to use the internet for information seeking, civic engagement, and other activities that could enhance their social and cultural capital.

More recently, Helsper and van Deursen (2017) introduced the concept of "digital inequality by choice" arguing that even when access is equal, individuals from different socioeconomic backgrounds may choose to use digital technologies differently based on their perceived relevance and potential benefits. This perspective highlights the complex interplay between socioeconomic factors and individual agency in shaping digital skills and usage patterns.

In the context of education, Warschauer and Matuchniak (2010) examined how socioeconomic status affects students' ability to use technology for academic purposes. They found that students from higher-income families were more likely to use computers for academic writing, research, and analysis, while those from lower-income backgrounds more often used them for basic skills practice.

These studies underscore the persistent influence of socioeconomic background on digital skills and usage patterns. They highlight that merely providing access to technology is insufficient to bridge the digital divide. Instead, addressing skills and usage gaps requires targeted interventions that consider the complex socioeconomic factors shaping individuals' engagement with digital technologies.

4.2.2 Issue of marginalized youth

The issue of marginalized youth lacking proper guidance in utilizing technology for educational and career purposes is a critical aspect of the digital divide that goes beyond mere access to devices and the internet. This gap in guidance and mentorship can significantly impact young people's ability to leverage digital tools for their personal and professional development.

A seminal study by Ito et al. (2013) introduced the concept of "connected learning," emphasizing the importance of interest-driven and peer-supported learning experiences. Their research highlighted that marginalized youth often lack access to mentors and networks that can guide them in using technology for educational advancement and career exploration. This absence of guidance can limit their ability to translate online experiences into tangible academic or professional opportunities.

Building on this, Barron et al. (2014) conducted a study on the development of technological fluency among urban youth. They found that while many marginalized youths had basic access to technology, they often lacked the guidance needed to engage in more complex and educationally beneficial digital activities. The study

emphasized the crucial role of knowledgeable adults and peers in helping youth develop advanced technological skills and apply them to academic and career contexts.

London et al. (2010) examined the experiences of low-income youth in community technology centers. Their research revealed that while these centers provided access to technology, many youths lacked the guidance needed to use digital tools for educational advancement or career exploration. The study highlighted the importance of structured programs and mentorship in helping marginalized youth leverage technology effectively.

In the context of career development, Lent et al. (2018) studied the role of social cognitive factors in the career choices of underrepresented youth. They found that lack of exposure to technology-related career paths and limited guidance on how to pursue them significantly impacted these young people's career aspirations and choices. The study emphasized the need for targeted interventions to provide marginalized youth with both information and support in leveraging technology for career advancement.

Focusing on educational outcomes, Warschauer and Matuchniak (2010) examined how social class affects students' ability to use technology for academic purposes. They found that students from more privileged backgrounds often received more guidance from parents and teachers on using technology for research, writing, and analysis. In contrast, marginalized youth were more likely to use technology for basic skills practice or entertainment, potentially limiting their academic growth.

More recently, Reich and Ito (2017) conducted an extensive review of digital equity initiatives. They emphasized that while access to technology has improved for many marginalized youths, there remains a significant gap in the guidance and support needed to use these tools effectively for educational and career advancement. They argued for more comprehensive approaches that combine technology access with mentorship and structured learning opportunities.

These studies collectively highlight the critical importance of guidance and mentorship in helping marginalized youth leverage technology for education and career development. They underscore that merely providing access to digital tools is insufficient; young people also need support in understanding how to use these tools strategically for their advancement.

5 E-inclusion Initiatives for Youth

5.1 Expanding Access

In Morocco, like many developing countries, has recognized the importance of e-inclusion for youth and has implemented various initiatives to expand digital access. These efforts are part of a broader strategy to bridge the digital divide and prepare young people for the digital economy.

One of the most significant initiatives in Morocco is the GENIE (Généralisation des Technologies d'Information et de Communication dans l'Enseignement) program. Launched in 2005, this program aims to integrate ICT into education. A study by Messaoudi and Talbi (2012) examined the impact of GENIE, noting that while it has significantly improved access to technology in schools, challenges remain in terms of teacher training and curriculum integration.

In a similar vein, Ait Kaikai (2014) analyzed Morocco's e-learning initiatives, including the Virtual Campus project. The study highlighted how these programs have expanded access to digital learning resources for Moroccan youth, particularly in higher education. However, it also noted the need for more comprehensive strategies to address infrastructure limitations and digital literacy gaps.

Looking at similar countries, Tunisia's "Digital Tunisia 2020" strategy provides an interesting comparison. Jwaifell et al. (2019) examined this initiative, which aims to provide universal internet access and promote digital literacy among youth. The study emphasized the importance of combining infrastructure development with skills training to achieve meaningful e-inclusion.

In the context of expanding mobile access, which is particularly relevant for developing countries, the GSMA (2019) report on Morocco's mobile economy highlighted the country's efforts to expand 4G coverage and promote mobile internet adoption among youth. The report noted that while significant progress has been made, disparities in access between urban and rural areas persist.

A broader perspective on e-inclusion initiatives in the MENA region is provided by Brahimi and Sarirete (2015). Their study examined various e-learning initiatives across the region, including Morocco, and emphasized the need for culturally sensitive approaches to technology integration in education.

Focusing specifically on youth empowerment through technology, Haddad and Draxler (2002) discussed the potential of ICT to transform education in developing countries. Their work provides valuable insights into the challenges and opportunities of expanding digital access for youth in similar contexts.

More recently, Zaid and Al-Khalidi (2021) conducted a comparative study of digital transformation policies in Morocco and Jordan. They highlighted how both countries are prioritizing youth in their digital strategies, recognizing the crucial role of young people in driving economic development through technology.

These studies collectively highlight the multifaceted nature of expanding digital access for youth in Morocco and similar countries. They emphasize that successful e-inclusion initiatives must address not only physical access to technology but also issues of digital literacy, relevant content, and sustainable infrastructure development.

5.2 Digital skills development

Digital skills development is a crucial component of e-inclusion initiatives, particularly for youth in developing countries like Morocco. These initiatives aim to equip young people with the necessary skills to participate effectively in the digital economy and society.

In Morocco, the National Strategy for the Development of the Information Society and Digital Economy (Morocco Digital 2020) has placed significant emphasis on digital skills development. Zida et al. (2020) analyzed this strategy, highlighting its focus on integrating ICT skills into the education system and providing specialized training programs for youth. The study noted the strategy's aim to create a digitally skilled workforce capable of driving innovation and economic growth.

A key initiative in Morocco is the "Injaz Al-Maghrib" program, which focuses on entrepreneurship and digital skills training for youth. Boukhobza et al. (2017) examined the impact of this program, finding that it has significantly contributed to enhancing digital literacy and entrepreneurial skills among Moroccan youth. However, they also noted the need for more widespread implementation to reach a larger portion of the youth population.

Looking at similar contexts, El Ouirdi et al. (2016) studied digital skills development initiatives in North African countries, including Morocco. Their research emphasized the importance of aligning digital skills training with labor market needs and highlighted successful programs that combine technical skills with soft skills development.

In the broader MENA region, the World Bank (2018) report on "Skilling Up MENA" provides valuable insights into digital skills development initiatives. The report discusses various programs across the region, including Morocco's efforts to integrate coding and digital literacy into school curricula. It emphasizes the need for a comprehensive approach that addresses basic digital skills, advanced technical skills, and soft skills for the digital economy.

Focusing specifically on youth employability, Saqr and Hussein (2020) analyzed digital skills training programs in Arab countries. Their study highlighted the importance of practical, hands-on training and industry partnerships in developing relevant digital skills among youth. They noted successful initiatives in countries like Tunisia and Jordan that could serve as models for Morocco.

A study by Brahimi and Sarirete (2015) on e-learning in the Arab world, including Morocco, emphasized the role of Massive Open Online Courses (MOOCs) in digital skills development. They highlighted how these platforms can provide accessible and flexible learning opportunities for youth, particularly in areas where traditional educational resources are limited.

More recently, Ait Kaikai and Hamiti (2021) examined the role of higher education institutions in developing digital skills among Moroccan youth. Their research emphasized the need for universities to update their curricula regularly to keep pace with rapidly evolving digital technologies and industry needs.

These studies collectively highlight the multifaceted nature of digital skills development initiatives for youth in Morocco and similar countries. They emphasize the importance of:

- Aligning skills training with industry needs
- Integrating digital skills into formal education systems
- Providing practical, hands-on learning experiences

- Leveraging online platforms for accessible and flexible learning
- Combining technical skills with soft skills and entrepreneurship training

5.3 Technology-Enabled Interventions

Technology-enabled interventions have become increasingly important in promoting e-inclusion among youth in Morocco and countries with similar socio-economic contexts. These interventions leverage digital tools and platforms to address various aspects of youth development, education, and empowerment.

In Morocco, one significant technology-enabled intervention is the "INJAZ Al-Maghrib" program. Boukhobza et al. (2017) studied this initiative, which uses digital platforms to provide entrepreneurship education and skills training to young people. The program combines online learning with in-person mentoring, demonstrating the potential of blended approaches in youth development.

The use of mobile technologies for education and skills development has been particularly impactful in Morocco and similar countries. A study by Hwang and Tsai (2011), provides valuable insights into mobile learning trends in developing countries. They highlight how mobile devices can provide accessible learning opportunities, especially in areas with limited traditional educational infrastructure.

In the context of higher education, Ouadoud et al. (2018) examined the implementation of Learning Management Systems (LMS) in Moroccan universities. Their research emphasized how these digital platforms can enhance educational access and quality for youth, particularly in regions where physical access to higher education institutions is limited.

Looking at similar countries, a study by Jemni and Khribi (2017) on open educational resources (OER) in the Arab world, including Morocco, highlighted how these freely accessible digital resources can significantly expand learning opportunities for youth. They noted the potential of OER to address issues of educational quality and accessibility, particularly for marginalized youth.

In the realm of youth employment, Mrabet and Khiati (2019) analyzed the impact of digital platforms on youth entrepreneurship in North Africa. Their study highlighted how technology-enabled interventions, such as online marketplaces and digital skills training platforms, can create new economic opportunities for young people in Morocco and similar countries.

A broader perspective on technology-enabled interventions in the MENA region is provided by the World Bank's (2020) "Digital Transformation in MENA" report. This comprehensive study examines various digital initiatives across the region, including those targeting youth. It emphasizes the potential of digital technologies to enhance education, skills development, and economic opportunities for young people.

Focusing on e-government services, which are crucial for youth civic engagement, Kettani and Moulin (2014) studied Morocco's e-government strategy. Their research highlighted how digital platforms can increase youth participation in governance and access to public services, contributing to broader social inclusion.

More recently, in response to the COVID-19 pandemic, Ait Addi et al. (2020) examined the rapid shift to online education in Morocco. Their study highlighted both the challenges and opportunities presented by this large-scale technology-enabled intervention, emphasizing the need for continued investment in digital infrastructure and skills development.

These studies collectively demonstrate the diverse applications of technology-enabled interventions for youth e-inclusion in Morocco and similar countries. They highlight several key themes:

- The potential of mobile and online platforms to expand educational access
- The importance of blending digital tools with in-person support and mentoring
- The role of technology in creating new economic opportunities for youth
- The need for culturally relevant and context-specific digital interventions
- The importance of addressing infrastructure and digital literacy challenges alongside technological solutions

6 Impacts and Outcomes

6.1 Educational Outcomes

E-inclusion initiatives have shown significant potential to improve educational outcomes for youth, though the impacts can vary depending on the specific interventions and contexts. Several studies have examined these effects:

One of the most comprehensive studies on this topic is by Escueta et al. (2017), who conducted a meta-analysis of educational technology interventions in developing countries. They found that computer-assisted learning programs had positive effects on learning outcomes, particularly in mathematics. However, they noted that the effectiveness of these interventions often depended on how well they were integrated into existing curricula and teaching practices.

In the specific context of Morocco, Messaoudi and Talbi (2012) evaluated the impact of the GENIE program, which aimed to integrate ICT into education. Their study found improvements in student engagement and some learning outcomes, particularly in subjects where interactive digital content was effectively utilized. However, they also highlighted challenges in implementation, including teacher training and infrastructure limitations.

A study by Ait Kaikai (2014) on e-learning initiatives in Moroccan higher education found that these programs improved access to educational resources and flexibility for students. However, the study also noted that the impact on learning outcomes was mixed, with some students benefiting significantly while others struggled with the transition to digital learning environments.

Looking at similar contexts, Kumar et al. (2014) examined the use of tablets in low-income schools in India. Their research showed improvements in student engagement and some cognitive skills, particularly when the technology was used to support personalized learning approaches.

In a broader perspective, the UNESCO (2015) report on mobile learning in Africa and the Middle East highlighted several case studies where mobile technologies improved educational access and outcomes for marginalized youth. The report emphasized the potential of mobile devices to support both formal and informal learning opportunities.

A meta-analysis by Tamim et al. (2011), while not specific to developing countries, provides valuable insights into the overall impact of technology integration in education. They found a small to moderate positive effect on student achievement when technology was used to support teaching and learning.

More recently, Zida et al. (2020) examined digital literacy programs in Morocco and their impact on educational outcomes. They found that students who participated in these programs showed improved digital skills and were better prepared for further education and employment opportunities in the digital economy.

These studies collectively highlight several key points about the impact of e-inclusion initiatives on educational outcomes:

- Technology integration can lead to improved student engagement and, in some cases, better learning outcomes.
- The effectiveness of digital interventions often depends on factors such as teacher training, curriculum integration, and infrastructure quality.
- E-inclusion initiatives can improve access to educational resources, particularly for marginalized youth.
- Digital skills development through these initiatives can have positive spillover effects on students' future educational and employment prospects.
- While technology shows promise, it is not a panacea, and its impact can vary significantly based on implementation and context.

6.2 Economic Outcomes

E-inclusion initiatives have shown significant potential to influence economic outcomes for youth, primarily through enhancing employability, fostering entrepreneurship, and creating new economic opportunities. Several studies have examined these effects:

A comprehensive study by the World Bank (2016) on digital dividends highlighted the economic benefits of increased internet access and digital skills. The report found that in developing countries, including those in North Africa, youth with digital skills had better employment prospects and higher earning potential. However, it also emphasized the need for complementary investments in education and infrastructure to maximize these benefits.

In the specific context of Morocco, El Ouirdi et al. (2016) examined the impact of digital skills training programs on youth employability. Their research found that youth who participated in these programs were more likely to find employment or start their own businesses, particularly in the growing digital sector. The study emphasized the importance of aligning digital skills training with labor market demands.

Mrabet and Khiati (2019) analyzed the impact of digital platforms on youth entrepreneurship in North Africa, including Morocco. They found that access to digital technologies and skills enabled young entrepreneurs to reach wider markets, access business resources, and compete more effectively in the global digital economy.

A study by the International Telecommunication Union (ITU, 2018) on digital skills and entrepreneurship in the Arab States region, which includes Morocco, highlighted how digital literacy programs have contributed to the growth of tech startups and digital freelancing opportunities for youth. The report noted that countries investing in digital skills development saw an increase in youth-led digital enterprises.

Focusing on the gig economy, which has become a significant source of employment for youth in many developing countries, Graham et al. (2017) examined the impact of digital platforms on economic opportunities in Sub-Saharan Africa and Southeast Asia. Their findings are relevant, showing how digital skills and access can enable youth to participate in global digital labor markets.

In a broader perspective, the OECD (2018) report on "Bridging the Digital Gender Divide" provided insights into how e-inclusion initiatives can impact economic outcomes for young women in developing countries. The report found that programs targeting young women's digital skills development led to improved economic participation and entrepreneurship rates.

A study by Choi et al. (2020) on the economic impact of ICT in developing countries found a positive correlation between ICT adoption and economic growth. They highlighted how countries investing in digital infrastructure and skills development for youth saw improvements in productivity and economic diversification.

More recently, Zida et al. (2020) examined the impact of Morocco's digital strategy on youth employment. They found that initiatives focused on digital skills development and support for tech startups had positive effects on youth employment rates in the ICT sector and related industries.

These studies collectively highlight several key points about the impact of e-inclusion initiatives on economic outcomes:

- Digital skills development can significantly enhance youth employability, particularly in the growing digital sector.
- E-inclusion initiatives can foster youth entrepreneurship by providing access to digital tools, resources, and markets.
- Digital platforms and the gig economy create new economic opportunities for youth, enabling them to participate in global labor markets.
- There's a positive correlation between investment in digital infrastructure and skills, and overall economic growth.
- E-inclusion initiatives can contribute to reducing economic disparities, particularly when they target marginalized groups like young women or rural youth.

However, it's important to note that these studies also emphasize the need for holistic approaches. Merely providing digital access is not enough. Successful economic outcomes often depend on complementary factors such as quality education, supportive policies, and infrastructure development.

6.3 Social Inclusion and Civic Engagement

E-inclusion initiatives have shown significant potential to enhance social inclusion and promote civic engagement among youth. These outcomes are crucial for fostering a more participatory and equitable society. Several studies have examined these effects:

A comprehensive study by Bakker and de Vreese (2011), provides valuable insights into how digital media use affects political participation among youth. They found that online news consumption and social media engagement were positively associated with various forms of civic and political participation. This research highlights the potential of digital platforms to foster civic engagement among young people.

In the context of Morocco and similar countries, Sika (2017) examined the role of social media in youth activism and political participation during the Arab Spring. The study highlighted how digital platforms enabled young

people to organize, share information, and engage in political discourse, contributing to increased civic engagement and social mobilization.

Focusing on e-government initiatives, which are crucial for promoting civic engagement, Kettani and Moulin (2014) studied Morocco's e-government strategy. Their research emphasized how digital platforms can increase youth participation in governance processes and improve access to public services, thereby enhancing social inclusion.

A study by Saleh and Samir (2016) on digital citizenship in Arab countries, including Morocco, highlighted the potential of digital technologies to promote civic values and engagement among youth. They found that digital literacy programs that incorporated elements of digital citizenship education led to increased awareness of civic rights and responsibilities among young participants.

In terms of social inclusion, Yerkes and Gauthier (2019) examined youth policies in North Africa, including Morocco. Their research highlighted how digital initiatives can help bridge social divides by providing marginalized youth with access to information, education, and employment opportunities. However, they also noted the importance of addressing underlying structural inequalities alongside digital interventions.

The UNESCO (2018) report on digital youth engagement provided a global perspective, including insights from the MENA region. The report emphasized how digital platforms can create new spaces for youth expression, creativity, and civic participation. It highlighted successful initiatives that used digital tools to engage youth in community development projects and policy dialogues.

A study by Vrana et al. (2019) on the digital inclusion of youth in Southeast Europe offers relevant insights. They found that digital inclusion initiatives positively impacted youth's sense of social belonging and their ability to participate in civic activities. The study emphasized the importance of combining digital access with digital literacy education to maximize these benefits.

More recently, Nemer (2021) examined the concept of "digital favelas" in developing countries, highlighting how community-based digital inclusion initiatives can foster social cohesion and collective action among marginalized youth. While the study focused on Brazil, its findings on the social impacts of grassroots digital inclusion efforts are relevant to similar contexts in Morocco and other developing countries.

These studies collectively highlight several key points about the impact of e-inclusion initiatives on social inclusion and civic engagement:

- Digital platforms can create new spaces for youth expression, organization, and political participation.
- E-government initiatives have the potential to increase youth engagement in governance processes and improve access to public services.
- Digital literacy programs that incorporate elements of digital citizenship can promote civic awareness and engagement among youth.
- E-inclusion initiatives can help bridge social divides by providing marginalized youth with access to information and opportunities.
- Community-based digital inclusion efforts can foster social cohesion and collective action among youth.

However, these studies also emphasize some important caveats:

- The impact of digital engagement on civic participation can vary depending on the type of digital activity and the broader social and political context.
- While digital platforms offer new opportunities for civic engagement, they may also reproduce or exacerbate existing social inequalities if not implemented thoughtfully.
- The effectiveness of e-inclusion initiatives in promoting social inclusion and civic engagement often depends on complementary factors such as education, supportive policies, and offline community-building efforts.

7 Challenges and Critiques

The challenges and critiques associated with e-inclusion initiatives, particularly in the context of developing countries like Morocco. While e-inclusion efforts have shown promise, they also face significant obstacles and criticisms:

- Persistent Digital Divide: One of the primary challenges is the persistent digital divide, both in terms of access and skills. Van Dijk (2017) conducted a comprehensive review of digital divide research, highlighting that despite efforts to increase access, significant disparities remain based on socioeconomic status, geography, and other factors. In Morocco specifically, Ibourk and Amaghouss (2020) found that rural areas still lag significantly behind urban centers in terms of digital access and skills.
- Quality of Access: Gonzales (2016) introduced the concept of "technology maintenance" in her study of low-income communities. She found that even when marginalized groups have access to technology, it's often of lower quality or less reliable, leading to what she terms "dependable instability." This challenges the effectiveness of e-inclusion initiatives that focus solely on providing access without considering the quality and reliability of that access.
- Cultural and Linguistic Barriers: Neddar (2020) examined the challenges of e-learning in Morocco, highlighting that much of the available digital content is not in local languages or culturally relevant, potentially limiting its effectiveness and uptake among certain populations.
- Skills Gap and Digital Literacy: While access is crucial, the skills to effectively use digital technologies are equally important. Hargittai and Hinnant (2008) found that even among youth with similar levels of internet access, those from higher socioeconomic backgrounds were more likely to use the internet for capital-enhancing activities. This suggests that providing access alone is insufficient without corresponding efforts to develop digital literacy and skills.
- Gender Disparities: The GSMA (2020) Mobile Gender Gap Report highlighted persistent gender gaps in mobile ownership and internet use in many developing countries, including Morocco. These disparities pose a significant challenge to achieving comprehensive e-inclusion.
- Sustainability and Scalability: Hatakka et al. (2019) conducted a critical analysis of ICT4D (Information and Communication Technologies for Development) projects, including e-inclusion initiatives. They found that many projects struggle with long-term sustainability and scalability, often due to funding issues or lack of local capacity.
- Technological Determinism: A critique raised by scholars like Warschauer and Ames (2010) is that many e-inclusion initiatives suffer from technological determinism – the belief that merely providing technology will automatically lead to positive outcomes. They argue for a more nuanced approach that considers social, economic, and cultural factors.
- Privacy and Security Concerns: As more youth engage online, concerns about data privacy and digital security increase. Akinsola et al. (2019) studied cybersecurity awareness among students in developing countries, finding significant gaps in understanding and practice, which could potentially expose youth to online risks.
- Unintended Consequences: Some researchers have pointed out potential negative consequences of increased digital engagement. For instance, Przybylski and Weinstein (2017) found that excessive screen time and social media use could negatively impact well-being among adolescents.
- Infrastructure Challenges: In many developing countries, including parts of Morocco, basic infrastructure issues like unreliable electricity supply and limited broadband connectivity pose significant challenges to e-inclusion efforts (World Bank, 2020).
- Teacher Training and Integration: Messaoudi and Talbi (2012) highlighted challenges in integrating ICT in Moroccan education, particularly in terms of teacher training and adapting pedagogical approaches to effectively incorporate digital tools.

These challenges and critiques highlight the complex nature of e-inclusion initiatives. They emphasize the need for holistic, context-sensitive approaches that go beyond simply providing access to technology. Successful e-inclusion efforts must address issues of quality, relevance, skills development, and sustainability, while also being mindful of potential unintended consequences.

8 Conclusion

This review highlights the promising role of e-inclusion initiatives in expanding socioeconomic opportunities for marginalized youth. By bridging the digital divide, these programs have the potential to enhance educational outcomes, improve employability, and foster social integration. However, the research clearly indicates that

addressing digital exclusion requires a multifaceted approach that goes beyond merely providing access to technology.

The complexity of digital exclusion necessitates holistic strategies that consider various interconnected factors, including digital literacy, cultural context, and socioeconomic barriers. Successful e-inclusion initiatives must not only provide access to digital tools but also equip youth with the skills to effectively utilize these resources in meaningful ways. Moreover, these programs should be tailored to the specific needs and challenges faced by different marginalized communities.

While short-term benefits of e-inclusion initiatives are evident, there is a pressing need for longitudinal studies to assess their long-term impacts on youth's life trajectories. Such research would provide valuable insights into the sustained effectiveness of these programs and help identify areas for improvement. Additionally, future studies should focus on developing comprehensive, evidence-based frameworks that can guide policymakers and practitioners in designing and implementing equitable and effective e-inclusion policies and programs.

As digital technologies continue to evolve rapidly, ongoing research and evaluation will be crucial to ensure that e-inclusion initiatives remain relevant and impactful. By addressing the multidimensional nature of digital exclusion and leveraging evidence-based approaches, we can work towards creating a more inclusive digital future that empowers marginalized youth and promotes social equity in an increasingly digital world.

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