

Digital Inclusion and Educational Equity Among First-Generation Learners

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Abstract: Over recent decades, digital technology has played a transformative role in reshaping the landscape of higher education. Online learning platforms, virtual classrooms, digital libraries, and educational applications have expanded learning opportunities. But despite rapid technology integration, there still exists a significant inequality in the education system, which is commonly known as the “digital divide”. This divide especially affects disproportionately underprivileged and marginalised groups of learners. The people from rural communities, economically weaker sections, tribal population, and gender based disadvantaged groups often face multiple barriers in accessing the benefits of digital education. Thus, this paper adopts a qualitative interpretative approach to explore the relationship between digital inclusion and education equity in the context of first-generation learners. The study posits that digital inclusion transcends mere access to technological devices, encompassing digital literacy, meaningful engagement, and institutional support. It underscores the dual function of digital technologies as both facilitators and impediments to equitable education. This paper contributes by providing a conceptual framework for understanding how layered inequalities influence the digital learning experiences of first-generation learners and educational strategies to promote inclusive education.

Keywords: Digital Inclusion, Education Equity, First-Generation Learners, Digital Divide, Socio-Economic Inequality.

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I. INTRODUCTION

Digital education has completely transformed the educational landscape in the 21st century. Tools such as online learning platforms, MOOCs (Massive Open Online Courses), virtual classrooms, mobile-based applications, and artificial intelligence have made the teaching and learning process flexible, personalised, and accessible. However, with the rapid expansion of digital technologies, a major concern has emerged: the digital aspect of educational inequality, also referred to as the “digital divide”. This divide is not just limited to digital access, but it also includes digital skills, usage patterns, and disparities in outcomes (Van Deursen, Helsper, & Eynon, 2017). In the Indian context, this issue becomes more complex as socio-economic, cultural, and geographical inequalities already exist. These disparities became more visible when digital education was integrated, especially during the COVID-19 pandemic. Many students, particularly from rural and marginalised backgrounds, were unable to utilize the benefits of online education effectively due to a lack of devices, poor internet connectivity, and limited digital literacy (Singh, 2022). In this context, first-generation learners emerge as a highly vulnerable group.

First-generation learners refer to students whose parents did not attain formal education, especially higher education. These learners are the first in their families to participate in a structured education system. Therefore, they face a lack of academic guidance, informal support, and cultural capital (Sinha and Raj, 2025). According to Pierre Bourdieu’s cultural capital theory, family background and social and cultural resources play a crucial role in learners’ academic success. First-generation learners have limited access to this capital, which directly impacts their educational experiences (Bourdieu, 1986). In the era of digital transformation, these challenges have become further layered. Now, not only are traditional academic barriers lacking, but digital competency has become a major obstacle. The concept of digital inclusion has become more important in this context. Digital inclusion means that individuals not only have access to technology but also are able to use it effectively and meaningfully for educational and social participation (Mendez-Dominguez et al., 2023). If learners have devices but do not know how to use them, or how to benefit from them, or do not get a supportive environment, then the digital inclusion remains incomplete. Many studies have consistently shown that digital devices are a multi-dimensional phenomenon, mainly categorised into three levels: Access divide, skill divide, and usage divide. First-generation learners often face disadvantages at all three levels. They have limited access,

insufficient digital skills, and their usage is mostly restricted to entertainment and not academic purposes (Van Deursen et al., 2017).

The rural-urban divide is also quite prominent in India due to the uneven distribution of digital infrastructure. Internet penetration in rural areas is comparatively low, and the connectivity that is available is unstable. Furthermore, devices are shared with households, making continuous learning impossible. These structural constraints create additional barriers for first-generation learners (Singh, 2022). Social culture factors also significantly influence this issue. Parents of first-generation learners are generally unfamiliar with formal education because they have never attended formal education, which makes them unable to provide academic or digital guidance to their children. This lack of support negatively impacts learners' confidence and engagement in learning. A qualitative study by Rose and Malkani (2021) observed that first-generation learners feel anxiety and uncertainty during the academic transition, which affects their performance.

At the same time, digital technology can also be a potential equaliser. Online platforms, open educational resources, and e-learning tools can provide learners with self-paced learning where they can access diverse knowledge sources. If it's properly implemented, this tool can reduce educational barriers and democratize learning opportunities. But this can be possible only when all components of digital inclusion access, skills, and support are adequately addressed.

National-level policies are also working towards promoting digital inclusion. For instance, the National Education Policy 2020 has emphasised strengthening digital learning and ensuring equitable access. The policy has clearly mentioned that inclusivity and accessibility should be prioritised when integrating technology into education (Ministry of Education, 2020). However, significant challenges remain at the implementation level, especially for students from marginalised backgrounds.

Therefore, this study aims to explore how digital inclusion shapes the educational experiences and outcomes of first-generation learners and which barriers are impacting the digital learning environment.

II. REVIEW OF THE LITERATURE

Michikyan et al. (2025) highlighted that both first-generation and continuing-generation students have access to the internet. Still, first-generation learners face some difficulty accessing fast, reliable internet and using multiple devices. Surprisingly, digital skills and engagements were found to be almost identical in both groups. However, first-generation students were found to have stronger academic motivation, despite issues with digital access; motivation is a strong factor that positively impacts learning outcomes.

Chikwe et al. (2024) found that digital learning is not equal for everyone because sociological barriers such as socioeconomic status, race, gender, and geographical location

play a big role, and mainly students with low income and rural backgrounds lack proper devices, internet access, and digital skills, which leads to poor learning outcomes. All these gaps can only be reduced, and education can be made inclusive through policies, funding, digital literacy training, and better infrastructure.

Gonzalez and Deng (2023) explored that social media platforms help students connect, share information, and find emotional support. Teen user types identified are scholars, community builders, and information seekers. However, with the help of social media, students find inspirational knowledge and comfort, which increases their academic performance and self-confidence.

Bailey and Nyabola (2021) explained that digital inequity is an important platform for quality and inclusion. Covid 19 has shown that lack of digital access is not just an economic issue but also a result of social, gender, and regional inequalities; simply increasing internet connectivity is not enough. Policies must specifically target marginalised groups, for example, women, rural, poor refugees, etc. Hence, the paper also argues that digital actions should be treated as a basic right and a public utility, along with infrastructure, digital literacy, affordability, trust, and inclusive governments, which are also essential to achieve real equality.

Tate and Warschauer (2022) highlighted that low-income and minority students face more challenges in online education. The digital divide affects the learning outcomes of students. And the performance gap in online learning is greater than in face-to-face, which is exacerbated for disadvantaged students. So, the paper suggests that equitable online learning can be achieved with better facilities, training, and inclusive strategies.

Overall, these studies collectively suggest that the relationship between digital inclusion and educational equity is complex and context-dependent.

➤ Objectives

- To illustrate the concept and theoretical background of digital inclusion in the context of first-generation learners.
- To identify the barriers learners face in the digital learning environment.
- To explore the relationship between digital inclusion and educational equity.

III. METHODOLOGY

This study adopts a conceptual, analytical, and literature-based research design. The information has been collected from various research papers, government reports, websites, and policy documents to understand learners' focus on subjective experiences, particularly in the context of digital inclusion and educational equity.

IV. DISCUSSION

➤ *Concept and Theoretical Framework of Digital Inclusion in the Context of First-Generation Learners*

The primary objective was to understand the concept of digital education in the context of first-generation learners, and findings suggest that defining digital inclusion solely as technological access is inadequate. The components, such as digital skills, motivation, and meaningful engagement, are equally important. Research also indicates that even when learners have devices, their effective participation may be limited if they lack adequate digital literacy and guidance (Van Dijk, 2020). Based on these perspectives, digital inclusion is a process-oriented concept that encompasses both outcome and access. The process becomes even more complex for first-generation learners, as their exposure and support systems are comparatively weak.

Therefore, the “digital divide” theory provides a foundational perspective for understanding a theoretical framework of digital inclusion. Studies have explained the digital divide in three layers: 1. the access divide (availability of devices and internet), 2. The skills divide (digital literacy), and 3. the usage divide (productive and meaningful use of technology) in the context of first-generation learners, these three levels are interconnected. Suppose a student from ruler or low-income background may not have a stable internet or personal devices, which limits their participation in online learning (Van Dijk, 2005).

In the context of Education, Lev Vygotsky’s “Social Constructivism” theory also helps in understanding digital inclusion. According to Vygotsky, learning is a social process that occurs through interaction and collaboration (Vygotsky, 1978). Peer interaction, teacher support and access to collaborative platforms are crucial for FGLs in online learning environments. If digital inclusion is not properly ensured, these students feel isolated in the learning process and their academic performance is negatively impacted.

The importance of digital inclusion was further highlighted during the COVID-19 pandemic, when the education system shifted largely online. Studies showed that FGLs were disproportionately affected due to a lack of devices, poor connectivity, and inadequate digital skills (Reinch et al., 2020). This situation reinforces that digital inclusion is an essential component of educational equity, not an optional add-on.

Thus, digital inclusion is a layered and complex process deeply interconnected with structural inequalities. In the context of FGLs, a digital inclusion framework can be effective when policies and practises focus on multi-level interventions, such as infrastructure development, digital literacy training, mentorship programs, and inclusive pedagogical strategies. Simply providing access to technology is not sufficient; it is essential to empower students to use digital resources effectively and improve their educational outcomes.

➤ *Barriers Learners Face in the Digital Learning Environment*

The findings highlight that first-generation learners face barriers at multiple levels, and the most prominent challenge is infrastructure limitations, including poor internet connectivity, device sharing, and limited technological resources. These findings align with broader research suggesting that socio-economic disadvantages significantly restrict digital participation (UNESCO, 2021). Furthermore, sociological barriers are equally significant. Parents of first-generation learners are generally unfamiliar with the formal education system, which leads to a lack of academic and digital support, and this lack of guidance negatively impacts learners’ confidence and engagement. Studies have also shown that home learning environment and parental involvement are critical factors for digital learning success (Dong et al., 2020). Psychological barriers have also been recognised as a significant component. It has already been demonstrated that students’ hesitancy, fear of technology, and low self-efficacy limit their involvement. This observation reinforces the idea that psychological readiness is a key component in digital integration (Ng, 2012).

Another significant barrier is cognitive overload. Digital platforms require learners to handle multiple tasks simultaneously, such as watching video lectures, taking notes, responding to chats, uploading assignments, etc. This multitasking increases their cognitive load, reducing both comprehension and retention. Particularly for learners using digital platforms for the first time, this process can be overwhelming (Sweller, 2011). Additionally, the lack of immediate feedback is a practical challenge. In physical classrooms, learners can immediately clarify doubts, but in online settings, responses are delayed. Teachers are unable to attend to each student individually, allowing confusion to accumulate. This gap significantly impacts learning outcomes and leads to frustration among learners.

The absence of peer interaction is also an underestimated barrier. Learning occurs not only through teacher-student interaction but also through peer discussion, group work, and informal conversations. On digital platforms, this interaction becomes limited or artificial. This has a direct impact on learners’ confidence, communication Skills, and collaborative learning. Research suggests that a lack of social interaction decreases both learners’ engagement levels and satisfaction (Hrastinski, 2009).

Another important barrier is digital fatigue or screen fatigue. Continuous screen exposure can lead to eye strain, headaches and mental exhaustion. This is particularly problematic for learners who attend multiple online classes daily. Over time, this fatigue reduces both motivation and concentration, leading to decreased learning efficiency.

Assessment-related challenges also create barriers for learners. Technical glitches, strict timing, and unfamiliar formats in online exams increase learners’ stress. Sometimes, even genuine efforts are thwarted, and marks are affected due to submission errors or connectivity issues. Furthermore,

there are concerns about fairness and transparency, which impact learners' trust.

➤ *Relationship between Digital Inclusion and Educational Equity*

Understanding the relationship between digital inclusion and educational equity requires a multi-dimensional theoretical approach. These studies are primarily based on digital inequality theory, the digital capital framework, social reproduction theory, and the capability approach. The integration of this framework provides a holistic understanding of how technological access, social-cultural context, and individual capabilities together influence the educational outcomes of first-generation learners.

Firstly, digital inequality theory is an advanced version of the traditional concept of the digital divide. Early studies viewed the digital divide solely from the perspective of access, distinguishing between individuals who could utilise the internet and those who could not. However, recent research has established that the real impact of inequality is understood when we also consider usage and outcomes. (DiMaggio and Hargittai, 2001) argued that even after internet access, differences in users' skills and usage patterns significantly affect the educational outcomes of learners. This means that inclusion is a layered process where inequalities persist even after access. The digital capital framework is another important approach, which is an extension of Bourdieu's capital framework. Digital capital is considered a composite resource that combines digital skills, technological access, and online participation. This theory explains that an individual's engagement in a digital environment depends on their existing social and cultural capital. First-generation learners generally have low digital capital, which directly impacts their academic engagement and learning outcomes (Park, 2017). The third framework is social reproduction theory, which explains educational inequality from a structured perspective and also suggests that the education system reproduces existing social inequality rather than eliminating it. According to Reay (2017), working-class and first-generation learners face symbolic disadvantage in educational institutions, which affects their participation and achievement when digital learning environments are introduced.

The impact of digital inclusion is dual in nature. On the one hand, digital technologies provide learners with diverse learning resources and flexible learning opportunities, which can enhance their academic achievement. These aspects support the idea that technology has the potential to democratise education (Hodges et al., 2020), but on the other hand, this technology can also deepen existing inequalities due to inadequate access and skills. This phenomenon can be explained by the concept of "second-level digital divide", where disparities are reflected in usage and outcomes (Hargittai, 2020). Furthermore, the capabilities approach, which builds on the work of Amartya Sen and Martha Nussbaum, views digital inclusion from a broader human development perspective. This approach emphasises that it is not just enough for individuals to simply have resources, but they must also have the capability to use those resources

effectively. In the context of education, this means that learners need skills, confidence, and a supportive environment to make meaningful use of the digital tools (Sen, 1999).

Overall, the discussion establishes that the relationship between digital inclusion and educational equity is not linear but rather operates through multiple mediating factors. If all components of digital inclusion access schemes and support are addressed equitably, it can promote educational equity. However, if this remains incomplete, inequality can be deepened.

V. CONCLUSION

Digital inclusion and educational equity are critical determinants for first-generation learners, where simply providing technological access is insufficient. Significantly influencing their educational experiences and outcomes. Digital technologies have made education accessible and flexible, but their benefits are not reaching all learners equally.

Therefore, achieving educational equity requires a holistic approach and learner-centred approach. Policymakers and educators work together to develop an inclusive digital ecosystem. It is essential to implement targeted intervention, digital literacy programs, and supportive teaching practices for first-generation learners. Ultimately, it can be concluded that digital transformation will be meaningful only when it is not limited to just technological advancement, but is aligned with broader goals of social inclusion and equity for all learners.

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