

Bridging Digital Inequality and Education: Exploring the Knowledge Gap through Türkiye's Lens

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Abstract

The rapid development of technology in recent decades has ushered in the Fourth Industrial Revolution, widely known as Industry 4.0. Within this transformation, an educational paradigm referred to as “Education 4.0” has emerged, aiming to align pedagogical practices with the digital and industrial demands of the era. Education 4.0 envisions a system where high-quality education is universally accessible, regardless of age, gender, orientation, ethnicity, religion, or language, through the effective use of digital technologies and the internet. However, the global shift to online learning during the COVID-19 pandemic has revealed a stark contradiction to this ideal—particularly in countries like Türkiye—where digital infrastructures and socio-economic disparities have exacerbated educational inequalities instead of mitigating them. This study critically examines these emerging inequalities through the lens of digital information gaps within the context of Education 4.0. It interrogates how digital inequality contributes to informational poverty and explores the broader implications for social inclusion within the educational system. Drawing on statistical data from the Turkish Statistical Institute’s (TURKSTAT) Household Information Technologies Usage Survey, the study identifies key parallels between the theoretical expectations of Education 4.0 and the actual lived experiences of digitally disadvantaged individuals. In doing so, it questions whether the deepening digital divide constitutes a new axis of educational stratification that demands more focused sociological inquiry.

Keywords

Education 4.0, Knowledge Gap, Digital Poverty, Digital Inequalities, Digital Divide

1. Introduction

Throughout human history, inequality has remained one of the most persistent and structurally embedded social challenges. From divisions rooted in ethnicity, gender, sexual orientation, and socio-economic status to disparities in access to healthcare and education, inequality manifests across multiple dimensions of life. In the contemporary era, as digitalization transforms nearly every aspect of society, a new form of stratification has emerged—digital inequality. This form of inequality is particularly salient in the context of education, where access to digital technologies and the internet has become a prerequisite for meaningful participation in learning processes.

As societies transition into what has been termed the Fourth Industrial Revolution (Industry 4.0)—a paradigm marked by the integration of cyber-physical systems, automation, artificial intelligence, and the Internet of Things (IoT)—the parallel evolution of education systems has given rise to what is commonly referred to as Education 4.0. This new educational model aims to align with the demands of a technology-driven labor market by promoting flexible, accessible, and personalized learning pathways that are no longer constrained by time or geography. The World Economic Forum (WEF, 2025) has emphasized this transition in successive summits, notably in 2016 and 2020, highlighting the rapid transformation of the job market, the rise of robot labor, the need for new digital skills, and the ethical questions raised by emerging technologies. This digital transformation also triggers a radical shift in the skills expected from the workforce. The report indicates that the “Education and Training” sector is being reshaped by a growing demand for skills in AI and big data. In this new ecosystem, competencies such as creative thinking, resilience, and technological literacy are becoming paramount. According to the WEF report, 59% of employers believe that their workforce will need to acquire new skills (upskilling/reskilling) by 2030, yet they view the skills gap as the biggest barrier to business transformation. These findings illustrate that digitalization is not merely an access issue but also creates significant inequalities in skill acquisition and adaptation processes (WEF, 2025).

However, despite the utopian promise of Education 4.0 to provide high-quality, equitable learning opportunities to all—regardless of age, gender, ethnicity, or socio-economic background—the global experience during the COVID-19 pandemic has revealed a starkly different reality. The shift to online education did not result in universal access to learning; instead, it magnified existing inequalities and created new forms of informational poverty, especially among marginalized groups lacking the digital infrastructure or competencies necessary for participation. As Van Dijk (2020) argues, digital inequality cannot be understood solely in terms of access to devices or internet connectivity; rather, it involves layered disparities in usage skills, educational content, and the capacity to convert information into social and economic capital.

In this context, digital capital (Ragnedda, 2018) becomes a key determinant of social inclusion, reinforcing Bourdieu’s (2002) broader theory of capital forms.

Digital capital is defined as the accumulation of digital competencies (skills, knowledge, and attitudes) and digital technology access, which together function as a form of capital that can be converted into other social, cultural, or economic advantages (Lindell, 2020). Consequently, Individuals with higher digital capital are better positioned to adapt to and benefit from technological changes, while those without it risk further marginalization in an increasingly digitized society. This situation calls into question the assumption that technological advancement naturally leads to social progress. Rather, it suggests the need for a critical examination of how Education 4.0—in its current form—may inadvertently reproduce or even deepen structural inequalities. To understand these inequalities more precisely, the digital divide can be conceptualized at three levels: 1) first-level divide—inequalities in physical access to digital technologies; 2) second-level divide—inequalities in digital skills and actual use; and 3) third-level divide—inequalities in the tangible outcomes and benefits derived from digital engagement (Van Deursen & Helsper, 2015).

This study aims to interrogate these contradictions by exploring how digital inequalities manifest within the framework of Education 4.0 in Türkiye. Drawing upon statistical data from the Turkish Statistical Institute's (TURKSTAT) Household Information Technologies Usage Survey, the study seeks to illuminate the socio-technical dimensions of the digital divide and evaluate its implications for equitable educational access. In doing so, it contributes to the growing body of sociological research that challenges the presumed neutrality of technology in shaping educational and occupational futures.

2. Understanding Industry 4.0 in a Sociological Context

The accelerating pace of digital transformation has rendered technology inseparable from everyday life. The current phase of this transformation is characterized by the integration of artificial intelligence (AI), the Internet of Things (IoT), and cyber-physical systems into industrial production processes—developments that collectively define what has come to be known as the Fourth Industrial Revolution, or Industry 4.0 (Schwab, 2016).

To understand the emergence of Industry 4.0, it is useful to briefly revisit the historical trajectory of industrial revolutions. The First Industrial Revolution, emerging in 18th-century Britain, marked the transition from artisanal, manual production to machine-powered factory systems (Mokyr, 1990). The Second Industrial Revolution introduced mass production through assembly lines and mechanization, epitomized by Fordist production models. The Third Industrial Revolution brought automation and programmable technologies, paving the way for flexible, post-Fordist production systems (Bell, 1973).

Industry 4.0 distinguishes itself by enabling machines to communicate, learn, and make decisions autonomously via cyber-physical systems (CPS) and machine-to-machine communication (Kagermann et al., 2013). This new industrial logic is closely tied to Big Data, cloud computing, machine learning, and real-time

analytics. The IoT connects devices—from smartphones to smartwatches and autonomous vehicles—into complex data networks, enabling seamless communication and predictive decision-making across platforms (Witkowski, 2017).

However, while technical innovations such as ChatGPT, Midjourney, and DALL-E receive widespread media attention for their creative capabilities, the more critical question lies not in how these technologies function, but in who benefits from them, and who is excluded. The sociological dimension of Industry 4.0 thus revolves around its impact on labor, social stratification, and access to knowledge and opportunity.

As digital labor increasingly replaces traditional forms of work, questions arise concerning employment precarity, skill polarization, and digital exclusion. Scholars such as Zuboff (2019) have warned of the emergence of surveillance capitalism, while Standing (2011) has argued that technological transformations contribute to the expansion of the precariat—a class of insecure, underemployed workers excluded from digital capital accumulation.

Industry 4.0 is not merely a technological phenomenon—it is a socio-technical transformation that reconfigures power relations, labor structures, and educational demands. While proponents emphasize its potential to democratize information and increase efficiency, critics stress the risks of deepening digital divides, especially in Global South contexts or among socioeconomically disadvantaged populations (Selwyn, 2011). The shift toward automated production systems also raises fundamental questions about how societies will reimagine work, education, and social cohesion in the age of intelligent machines (Brynjolfsson & McAfee, 2016).

3. Technological Determinism Revisited: Education 4.0

The foundational premise of Education 4.0, often framed as the precursor to Society 5.0, is the creation of an inclusive educational system where individuals can thrive based on their unique talents, free from differentiation based on inherent or acquired characteristics such as age, ethnicity, gender, or language (Savaneviciene et al., 2019). This utopian vision is built upon a historical progression of educational paradigms, as described by Almeida and Simoes (2019):

- Education 1.0: The traditional model centered on formal assessments.
- Education 2.0: A transitional phase that introduced open technologies and greater emphasis on group work within institutional settings.
- Education 3.0: An evolution beyond classroom boundaries, promoting student engagement in open environments and leveraging social networks.
- Education 4.0: The current model, which promises to be an AI-supported system where learning models are adapted in real-time to the student's profile and abilities.

While this macro-level narrative of digital transformation in production, society, and education is widely accepted, a critical sociological perspective reveals a fundamental oversight: the neglect of digital inequalities and digital poverty. Digital poverty refers to the condition in which individuals or communities lack not

only access to digital technologies such as internet and devices but also the skills, resources, and support necessary to participate fully in the digital environment (Helsper & Van Deursen, 2017).

However, this definition alone does not capture the broader socio-economic and political dimensions that sustain digital inequalities. The prevailing liberal and capitalist discourse naively assumes a homogenous society, positing that increased access to technology, including in education, will automatically eradicate existing inequalities. This perspective can be critiqued as a form of technological determinism, a core sociological concept that challenges the notion of technology as an autonomous force (Hauer, 2017). This viewpoint, which you aptly describe as “scientism” or technological determinism, posits that technological progress is an unmitigated good capable of solving social problems without ethical or social intervention.

Drawing on historical critiques of scientific progress, one can echo Haldane’s (1923) cautionary tale. His core argument, which is highly relevant here, is that scientific and technological advancement should be viewed with suspicion if it is not guided by a robust ethical framework. Otherwise, the “fire of Prometheus will return to burn its creator.” This critique is further strengthened by linking it to contemporary sociological theories.

Scholars such as Calderón Gómez (2020) and Van Deursen & Van Dijk (2009) have shown that the digital divide is not a simple binary of “haves” and “have-nots.” Instead, it is a multilayered issue encompassing the first-level digital divide (access to technology) and the second-level digital divide (differences in skills and effective use). This distinction is critical because, even with physical access, individuals with lower cultural capital—defined by Bourdieu as accumulated knowledge and skills—are less likely to convert that access into meaningful educational and social benefits (Vincze, 2024).

The global experience of the COVID-19 pandemic and recent domestic crises, such as the earthquake disaster, have unequivocally demonstrated the profound depth of these questions. The challenges to remote education during these events have starkly revealed the deep-seated nature of digital exclusion and cast significant doubt on the promises of a classless, egalitarian society heralded by Industry 4.0. Empirical studies from the pandemic era confirm that the second-level digital divide was a major barrier to effective online learning, as students from disadvantaged backgrounds struggled not only with a lack of devices but also with a deficit in the necessary skills and support to succeed (Ceviker & Gezer, 2023; Jamil & Muschert, 2023). This paper will therefore unpack the concepts of digitalization, Industry 4.0, Society 5.0, and Education 4.0, using the lens of digital inequality to interrogate these claims.

4. Beyond Access: Mapping the Multidimensional Digital Divide in Türkiye

This study draws on publicly available secondary data from the Turkish Statistical

Institute (TURKSTAT), specifically the Household Information Technology Usage Survey (2018-2022) and the Information Technology Usage Survey on Children (2021). Key variables include household internet access rates, individual internet usage rates, types of connection, and selected demographic breakdowns (e.g., gender, region, age). The data are used descriptively to illustrate patterns of digital inequality rather than to perform causal statistical analysis. As these surveys rely on self-reported responses, potential biases such as recall errors and social desirability effects may influence the precision of reported rates; nonetheless, they remain the most comprehensive national source for tracking digital access and use in Türkiye. This section presents a discussion of metadata from TURKSTAT statistics regarding the manifestations of digital inequalities specific to Türkiye.

According to the 2018 data from the Turkish Statistical Institute (TURKSTAT)'s Household Information Technology Usage Survey, computer and internet usage rates, which vary by age, education level, and labor force status, are consistently higher among men than women across nearly all age groups, education levels, and employment statuses (TURKSTAT, 2019). The same survey indicates that internet usage among individuals aged 16 - 74 stands at 75.3%. However, only 49.1% of these households have fixed broadband connections (ADSL, Fiber, etc.). In 2020, the rate of internet access from home increased to 90.7% (TURKSTAT, 2020). This figure reached 92.0% in 2021 (TURKSTAT, 2021a) and 94.1% in 2022. Considering an annual growth rate of approximately 2%, statistics for 2023 are likely to exceed 96%. Regarding internet usage, the percentage appears lower compared to household access rates: 79.0% in 2020, 82.6% in 2021, and 85.0% in 2022 (TURKSTAT, 2022). The gap between internet access and usage rates indicates the presence of individuals who, despite having internet access, do not or cannot use it.

Another striking statistic from the research reveals that when internet usage rates are examined by gender, men demonstrate higher usage rates compared to women. In 2020, internet usage rates were 84.7% for men while remaining at 73.3% for women. When considered parallel to household internet access and usage rates for the same year, it becomes evident that household internet is predominantly used by men. In 2021, the rates were 87.7% for men and 77.5% for women, while in 2022, the figures were 89.1% and 80.9%, respectively. As observed, the gap between male and female internet usage decreased only from 11% to 8% over three years. From this perspective, it can be stated that gender equality in internet usage has not been achieved.

The same research shows that the proportion of individuals utilizing public services online has increased annually: 51.5%, 58.9%, and 68.7%. When recalling household internet access rates for these same years (90.7%, 92.0%, 94.1%), access to public services such as e-government and MHRS among individuals with internet access remains considerably low. The existence of individuals who experience difficulties accessing online public services or lack the knowledge to use them should not be overlooked, as this gap may already contribute to inequality. Con-

sidering the Industry 4.0 framework, where the future is expected to be increasingly integrated with technology and IoT, individuals lacking the ability to access public services online may find it impossible to protect their rights and conduct their transactions. However, when the problem is taken to the next level, disparities in usage may likely be observed in various activities that can be obtained from unequally used internet, including information acquisition, online communication, interaction, and learning.

Another observable disparity involves demographic access differences. According to the Statistical Regional Units Classification, the household internet access rate shows TR1-Istanbul leading with 97.1% access (TURKSTAT, 2021a). TR5-West Anatolia (Ankara, Konya, Karaman) ranks second with 94.2%. While these regions have the highest access rates, the lowest regions by year are: 2020-TR8 (West Black Sea) at 81.3%, 2021-TR8 (West Black Sea) at 84.5%, and 2022-TRA (Northeast Anatolia) at 88.2%. Statistical evaluation reveals that regions with the highest access rates exceed the reported average, while remaining regions fall considerably below the general average. In this situation, compared to Istanbul, which is 5.1 points above the declared general percentage of 92.0%, some regions lag 6 points behind. This translates to approximately a 10.3 percentage point difference in internet access. When compared to EU averages, where 94% of households had internet access in 2024, Türkiye's overall connectivity levels remain below European standards, with particularly pronounced disparities in rural and underdeveloped regions (Eurostat, 2024).

According to 2021 data from another TURKSTAT (2021b) survey, the "Information Technology Usage Survey on Children," 82.7% of children have internet access. Parallel to data released for adult individuals in the same year (although the gap is smaller), internet usage percentages among boys (83.9%) are higher than among girls (81.5%). The 2.4 percentage point gender gap among children suggests early socialization into gendered technology practices, reflecting broader patterns of digital inequality that emerge during formative years. 86.2% of children indicated they use the internet to participate in online classes. The research shows that the proportion of boys playing digital games (46.1%) is higher than that of girls (25.4%).

These disparities, evident across gender, region, and age, align with the core proposition of Knowledge Gap Theory, which suggests that advantaged social groups adopt and utilize new information resources more rapidly, thereby widening pre-existing inequalities over time despite overall increases in access. While this rapid increase in access suggests a closing of the "first-level digital divide," academic studies on Türkiye's digital divide emphasize that access alone does not guarantee equal usage or benefits (Alp & Baycan, 2023).

5. Beyond Connectivity: Digital Inequalities as Structural Exclusion

Earlier chapters in the study, primarily addresses the claims of concepts such as

Industry 4.0 and Education 4.0 within the context of their emergence. However, contrary to these ideas, it is evident even in the macro and extensive TURKSTAT data that digitalization is not distributed equally (like capital) and that a digital divide is experienced. The concept of digital divide is one that shows the gap between those who can access the latest information technologies and those who cannot (Compaine, 2001). Hargittai (2003) and Salinas (2003) added the relationships of using and accessing digital technologies to this concept, stating that the situation should also demonstrate the difference between those who use these technologies and those who do not. According to the definition of digital divide established by the OECD (2001), digital divide refers to the differences observed in terms of access to information and communication technologies and internet usage opportunities among individuals, households, businesses, and geographical regions at different socio-economic levels. These opportunities are strikingly visible in the data. In short, the concept of digital divide has been evaluated through the accessibility and usability of Information and Communication Technologies (ICT). From the broadest perspective, fundamental differences and inequalities can be observed on a country and geography basis. For example, according to research conducted by the OECD (2001), the difference in information and communication technology usage between developed and less developed countries (least developed countries) is gradually increasing. This difference has brought about a poverty discussion expressed as “information poverty” that parallels the digital divide (Kalaycı, 2013). While educated individuals being good ICT users increases their wages in the labor market, it reduces job demand for individuals who cannot use these technologies at the same level. In this respect, it can be said that there is a new inequality added to the inequalities that may occur in wages. Therefore, emphasis should be placed on which segments or classes digitalization will bring more equality to. Because the problem is not in a situation that can be solved by owning ICT products. User applications should also be evaluated within this problematic. Simply owning tools and equipment is not sufficient to overcome this digital division and digital poverty. At the same time, one must also have the skill to use the equipment. When the problem is further deepened, another issue is how access and usage rates may differ according to age range, gender, disability, and disadvantages. However, this problem is hardly addressed in the reports of national and international organizations. The views of international organizations such as the IMF, like their predictions for the development of countries that would transition to free market economy in the 1980s, include efforts to increase wealth and reduce poverty by imitating institutions and practices in developed countries. As ICT access increases, the idea and studies that poverty will decrease in less developed and developing countries, and that the internet will increase wealth and prosperity have intensified (Kalaycı, 2013). Therefore, perspectives have remained as a reductionist perspective where technology ownership and development would be directly proportional.

As seen, parallel to the poverty literature, there is also a macro, liberalism, ne-

oliberalism, and capitalism-focused view on digital poverty. ICT access will only provide equality in consumption; it will not provide the ability to use, access to information, and therefore the ability to exist in the digital world.

Additionally, a parenthesis should be opened regarding the importance of access to information; although information appears to be an abstract concept, within today's information society (Society 5.0), it stands before us as an element of influence due to being a means of generating financial power (Baştürk Akça & Kaya, 2016). Information that does not create material gain and has no financial value is considered insignificant. In this period we entered in 2021, problems regarding ICT access create problems in accessing information and even prevent access to information. The importance of information in production relations and the job market brings with it the foresight of equal opportunity in this field, and when evaluated from this perspective, ICT access should be viewed as a citizenship right. The issue of digital poverty should be addressed within social policies (Baştürk Akça & Kaya, 2016).

On the other hand, existing inequalities in social life are also reflected in the digital realm. When looking at the issue from the perspective of rural and urban distinction; during the distance education process that has continued since March 16, 2020, due to the COVID-19 pandemic, it has been observed that students living in rural areas could benefit less from distance education compared to students living in urban areas due to their socioeconomic conditions (Nerse, 2020). When it is considered that the education process continuing on digital platforms may continue for many years, repeat, or undergo complete transformation, poverty may become chronic and cause reproduction for households or individuals as the possibility of finding jobs and entering the job market decreases.

This digital inequality situation clearly seen during the pandemic process, when evaluated with the Knowledge Gap Theory, shows that inequality can create a new class division. According to Tichenor et al. (1970); when information exchange occurs in ICT, individuals in higher socioeconomic classes will acquire knowledge more rapidly here. Thus, despite all discussions on Education 4.0 and Society 5.0, the knowledge gap among individuals in lower socioeconomic classes will not decrease, equality or balance will not be achieved; on the contrary, it will deepen and increase.

6. Conclusion

The presence of courses such as coding and robotic coding in private schools in Türkiye, while students in public schools do not receive education in these subjects, has the potential to cause them to lag behind in their participation in the workforce when they graduate within the framework of the new norm mentioned in Society 5.0. This disparity reflects what Castells (2015) identifies as the division between “space of flows” and “space of places”, where digitally connected elites access global networks while others remain confined to local limitations. It is clear that digital literacy will be a fundamental skill in our near future and may cause a

new class division between those who are digitally literate and those who are not in the future. Whether individuals are digitally literate or not cannot be considered independently of their socioeconomic status in the current system. This thought, as previously mentioned in the study, has qualities that may lead to following a reductionist approach that examines equality through access to ICT tools. The transformation of ICT tools into means of production with Industry 4.0 carries the potential for those who use these tools to transform into capital at this point. Those who are not digitally literate, those who do not use ICT tools or do not have access to means of production should be evaluated within the social science literature in terms of the possibility of seeing a new class struggle. This process aligns with Bourdieu's concept of digital habitus, where socioeconomic positioning shapes individuals' dispositions toward technology, creating durable inequalities that reproduce across generations (Robinson, 2009).

So much so that according to the OECD (2019), TALIS report of 2018, 22% of school principals in Türkiye stated that there are inadequacies and deficiencies in the use of digital technology in teaching in their schools. Another striking statement in the same report is that teachers in Türkiye need advanced ICT skills. In the distance education report dated September 4, 2020, by Eğitim Sen, it can be clearly seen that no work has been done to address these deficiencies identified in 2018. The findings of the research titled "Deep Poverty and Access to Rights during the Pandemic Period" (Göçmen et al., 2020) show us that the situation is not very different in the world. It is seen that the risk of children from low-income families dropping out of education emerges as an important theme. 57% of parents state that their children cannot follow distance education lessons. The reasons for not being able to follow the lessons are not having and not being able to use ICT tools. Van Dijk's (2020) multi-dimensional access model reveals that Türkiye's challenge lies not merely in material access but in meaningful usage patterns that require skills and social support. In light of these data, it is once again seen that the main reason for children's inability to access their basic right to education is their socioeconomic conditions.

An intersectionality analysis reveals how digital inequalities cannot be understood through single categories but must be examined through the intersection of multiple identities and disadvantages (Crenshaw, 1989). The research findings demonstrate how gender intersects with geographical location and socioeconomic status, creating compounded disadvantages for rural women and children from low-income families. This intersectional disadvantage becomes particularly pronounced in educational contexts, where multiple barriers to digital participation create what Noble (2018) terms "algorithmic oppression" that reinforces existing social hierarchies.

The COVID-19 pandemic has crystallized what researchers term the "post-pandemic digital divide," revealing how emergency remote teaching exposed and potentially exacerbated existing educational inequalities (Beaunoyer et al., 2020). Unlike pre-pandemic digital divides that primarily affected supplementary activ-

ities, the shift to emergency remote teaching made digital access a prerequisite for basic educational participation. This transformation suggests that digital inequalities may have permanent consequences, creating what [Dorn et al. \(2020\)](#) identify as “COVID learning loss” that disproportionately affects disadvantaged students. The normalization of hybrid learning models means these inequalities may persist long beyond the pandemic’s resolution.

The distinction between digital literacy and digital fluency becomes crucial in understanding persistent inequalities. While digital literacy focuses on basic operational skills, digital fluency encompasses critical thinking, problem-solving, and creative application of technology ([Resnick, 2002](#)). Educational policies promoting digital inclusion often conflate these concepts, assuming that basic access leads to meaningful engagement. However, research demonstrates that socioeconomically disadvantaged students may achieve basic digital literacy but struggle to develop the digital fluency necessary for academic and professional success ([Warschauer & Matuchniak, 2010](#)).

UNESCO’s (2023) latest Digital Education Report reveals that global digital learning inequalities have widened since 2020, with low-income countries facing particular challenges in digital infrastructure and teacher training. The report identifies “digital learning poverty” as a critical barrier to achieving Sustainable Development Goal 4, particularly affecting girls and rural populations. These findings align with Türkiye’s experience, where despite increasing connectivity rates, meaningful educational technology integration remains uneven across socioeconomic and geographical lines.

The International Telecommunication Union’s Digital Development Dashboard (2023) positions Türkiye in the “transitional” category for digital development, highlighting persistent gaps in digital skills and meaningful connectivity. While infrastructure development shows progress, the ITU emphasizes that “digital by default” policies risk excluding those lacking digital competencies, aligning with the knowledge gap hypothesis predictions regarding deepening inequalities.

OECD’s Programme for International Student Assessment (PISA) (2022) results reveal Türkiye’s challenges in digital literacy, ranking below the OECD average in creative thinking and digital problem-solving skills. Particularly concerning is the significant performance gap between socioeconomically advantaged and disadvantaged students, with the difference exceeding 100 score points in digital literacy tasks. These results validate concerns that technology access alone cannot address educational inequalities; students from lower socioeconomic backgrounds struggle not only with basic digital skills but also with the higher-order thinking skills necessary for academic success in digital environments ([OECD, 2023](#)).

In light of all the statistics used, this situation can be evaluated as a factor that reinforces the culture of poverty. Similar to the self-fulfilling prophecy theory in psychology [(pygmalion effect, pygmalion effect) [Rosenthal, 2010](#)], the culture of poverty can be expressed as falling into such a situation due to the influence of structural conditions that prevent them from taking the necessary social, political

and economic actions to meet their needs by eliminating an environment where they can invest in their qualities (Lewis, 1966). Since families in low-income groups cannot provide their children with the necessary tools to participate in distance education, this situation leaves children out of digital literacy, behaviors and habits related to ICT use, and therefore may cause them to remain outside the new normal, new system. In this way, it does not seem very possible for them to get out of the vicious circle of the culture of poverty.

This analysis reveals that the optimistic rhetoric surrounding Industry 4.0, Education 4.0, and Society 5.0 may inadvertently mask the reproduction of existing inequalities through digital means. Rather than creating more equitable educational and social systems, these technological transformations risk creating new forms of digital stratification that compound existing disadvantages. The theoretical frameworks examined here suggest that addressing digital inequalities requires not merely technological solutions but comprehensive social policies that address the underlying structural inequalities that shape digital participation patterns.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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