THE DIGITAL DIVIDE: A LOOK INTO TEACHERS AND STUDENTS' STRUGGLE TO CONECTIVITY

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Abstract. The digital divide, defined as the gap between those with access to information and communication technology and those without, remains a significant challenge in education, particularly in Indonesia, where access to technology and digital literacy remains unequal (Ministry of Communication and Informatics & Katadata Insight Center, 2022; Ministry of Education, Culture, Research, and Technology, 2024). This study examines the positive side of the digital divide challenges experienced by teachers and students in the learning process. Using descriptive qualitative methods through a literature review, this study examines various studies published between 2018 and 2025 that focus on issues of connectivity, digital inequality, and how teachers and students adapt in the digital learning era. Although the digital divide is often considered a barrier to equal access to education (Warschauer, 2018; van Deursen & van Dijk, 2019), several studies show that this condition actually encourages innovation, collaboration, and creativity in teaching and learning activities (OECD, 2020; UNESCO, 2021). Teachers are beginning to develop learning strategies that adapt to network limitations, such as blended learning methods and the use of offline media (Almeida & Silva, 2022). Meanwhile, students are becoming more independent, technologically literate, and resilient in the face of changes in the learning system (Miah, 2023; Dabie, 2025). This

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study concludes that while the digital divide presents challenges, it also presents significant opportunities for educational transformation toward a more creative, adaptive, and sustainable direction.

Keywords: *Digital divide, connectivity, Struggle.*

Abstrak. Abstrak Kesenjangan digital, yaitu kesenjangan antara mereka yang memiliki akses terhadap. teknologi dan mereka yang tidak memilikinya, masih menjadi masalah besar dalam dunia pendidikan, terutama di Indonesia, di mana akses teknologi dan kemampuan digital belum merata (Ministry of Communication and Informatics & Kata data Insight Center, 2022; Ministry of Education, Culture, Research, and Technology, 2024). Penelitian ini membahas sisi positif dari tantangan digital divide yang dialami guru dan siswa selama proses pembelajaran. Dengan menggunakan metode kualitatif deskriptif melalui studi literatur, penelitian ini meninjau berbagai penelitian terbitan tahun 2018 hingga 2025 yang membahas konektivitas, ketimpangan digital, serta cara guru dan siswa beradaptasi di era pembelajaran digital. Walaupun digital divide sering dianggap sebagai hambatan dalam pemerataan pendidikan (Warschauer, 2018; van Deursen & van Dijk, 2019), beberapa penelitian menunjukkan bahwa kondisi ini justru mendorong munculnya inovasi, kolaborasi, dan kreativitas dalam kegiatan belajar mengajar (OECD, 2020; UNESCO, 2021). Guru mulai mengembangkan strategi yang menyesuaikan keterbatasan jaringan, seperti pembelajaran campuran dan penggunaan media offline (Almeida & Silva, 2022). Di sisi lain, siswa menjadi lebih mandiri, berkembang dalam literasi digital, dan lebih tangguh menghadapi perubahan sistem belajar (Miah, 2023; Dabie, 2025). Penelitian ini menyimpulkan bahwa meskipun digital divide menimbulkan tantangan, kondisi ini juga membuka peluang besar untuk mengarah pada transformasi pendidikan yang lebih kreatif, adaptif, dan berkelanjutan.

Kata Kunci: Kesenjangan Digital, kesulitan, konektivitas.

INTRODUCTION

In In today's era, the internet and new inventions have become a very important part of how we learn. Most teaching and learning now depends a lot on online tools and a strong internet connection. As UNESCO (2021) stated, technology broadens the learning process because students can search for information from various sources and

learn at any time. We saw this as true, especially since learning has shifted to digital systems. Teachers can also make learning more engaging and flexible, as explained by the OECD (2020) regarding the use of online platforms that can increase interaction and creativity.

However, these technological advances are not always enjoyed equally. The words "digital divide" mean the difference between groups that have access to technology and those that do not (van Deursen & van Dijk, 2019). We think this problem is very clear in many places, especially when some students cannot join in learning because they do not have devices or a good internet connection, Warschauer (2018) also emphasized that differences in access to technology can lead to disparities in learning opportunities. This made our realize that while technology is helpful, it remains a significant barrier for some.

However, many studies show that the digital divide does not only cause bad things to happen. It turns out that this situation helps teachers and students come up with new ideas. Almeida & Silva (2022) found that many teachers are trying to find different ways to keep teaching even when the internet is not always working well.. In our opinion, this creativity arises from necessity, not just ability. Teachers are starting to use simple media such as offline videos, voice messages, or printed materials, so that learning can continue.

Not only teachers, but students are also showing significant changes in attitude. Miah (2023) Miah's study in 2023 showed that students build better independence and get used to finding their own ways to learn when they don't have many digital tools. We strongly think this skill is very important for what they do later, making them stronger and helping them keep going when things get hard. Also, this challenge creates a team feeling among teachers, families, and people in the area, as Dabie's study in 2025 showed. We saw this team effort as helpful, making the connections between schools and their nearby communities stronger.

Looking at the information we have, the gap in technology access makes learning harder but also opens doors for new improvements. These problems have helped to push changes, encourage creative thinking, and inspire the creation of learning methods that can change more easily. Because of this, the technology gap shows differences but also makes a place where good changes can happen.

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THEORETICAL STUDY

The concept of the digital divide has been widely discussed in educational research as a form of inequality that affects access to learning resources and opportunities. Initially, the digital divide was understood mainly as a gap in physical access to computers and the internet. However, recent studies emphasize that this concept has evolved to include differences in skills, usage patterns, and the ability to benefit meaningfully from digital technology (van Deursen & van Dijk, 2019). In education, this inequality influences students' academic performance, participation, and motivation, particularly in contexts where learning increasingly depends on digital platforms.

Warschauer (2018) explains that the digital divide is closely related to social and economic inequality. Students from disadvantaged backgrounds are more likely to experience limited access to devices, unstable internet connections, and insufficient guidance in using digital tools. As a result, these students often face barriers in completing assignments, participating in online learning, and developing digital literacy skills. This condition may widen educational gaps if not addressed through appropriate pedagogical strategies.

Despite its challenges, several theoretical perspectives argue that the digital divide can stimulate adaptation and innovation in teaching and learning. From the perspective of adaptive learning theory, limitations in resources encourage educators to modify instructional methods to suit learners' contexts. UNESCO (2021) emphasizes that resilient education systems are those capable of adjusting to crises and constraints, including limited digital access. In this view, the digital divide becomes a driving force for pedagogical flexibility rather than merely a barrier.

The theory of teacher innovation also supports this perspective. OECD (2020) highlights that teachers often respond creatively to difficult teaching conditions by developing alternative learning strategies. In low-connectivity environments, teachers may adopt blended learning approaches, combine online and offline materials, and prioritize essential learning outcomes. These practices demonstrate that effective teaching does not solely depend on advanced technology but also on teachers' professional judgment and creativity.

From the learners' perspective, self-directed learning theory explains how students adapt to limited digital resources. Miah (2023) argues that students who face

technological constraints tend to develop higher levels of independence, responsibility, and problem-solving skills. When students cannot rely fully on digital platforms, they are encouraged to manage their time, seek alternative learning sources, and actively engage in the learning process. This experience contributes positively to their long-term learning habits.

In addition, community-based learning theory emphasizes the role of social collaboration in overcoming educational challenges. Dabie (2025) explains that cooperation among teachers, parents, and local communities becomes stronger when schools face digital limitations. Shared responsibility and mutual support help ensure that students continue learning despite limited resources. Therefore, theoretically, the digital divide can be understood not only as a technological issue but also as a social and educational phenomenon that reshapes teaching and learning practices.

METHOD

This research used a qualitative descriptive approach with a literature review. The purpose of this method is to collect, analyze, and interpret findings from previous research related to the digital divide and its impact on teachers and students, with a primary focus on the positive outcomes and strengths that emerge from this challenge.

This study used qualitative descriptive design and a systematic literature review. This method was used to collect, evaluate and synthesize the findings of previous studies related to the digital divide and its impact on teachers and students. Following Snyder's (2019) framework, the literature review methodology consisted of three major steps: the preparation, the exploration, and the review of relevant documents. Data were retrieved from peer reviewed journals, reports of global bodies and national educational statistics published between 2018 to 2025.

The method starts with identifying scope phrases such as digital divide, connection barriers, digital inequality, instructor remediation, and student flexibility. Journals articles and reports were identified through repositories including Google Scholar, ERIC, ProQuest paid journals collection services were limited to 2007 to 2020. Inclusion criteria focused on research on challenges and opportunities offered by limited digital access particularly in educational contexts (Warschauer, 2018; OECD, 2020).

Exclusion criteria disqualified papers that were not related to formal schooling contexts, or that did not provide empirical or theoretical insights.

Themes emerged from consistent patterns within the literature in particular, those associated with positive outcomes such as innovation, collaboration and increased digital literacy. This approach aligns with the principles of qualitative synthesis that aim to interpret and integrate different findings into a coherent understanding (Snyder, 2019).

RESULTS AND DISCUSSION

The Result

The results of this study, based on the analysis of several literature sources, show that the digital divide does not only bring challenges but also creates opportunities for growth, innovation, and transformation in the education sector. Many teachers and students who initially struggled with limited internet access and technological tools have gradually developed new strategies and creative solutions to continue the learning process effectively.

1. Teachers' Adaptation and Innovation

    Teachers have shown remarkable adaptability in the face of technological limitations. Research by Almeida and Silva (2022) revealed that many teachers in areas with poor connectivity successfully combined offline and online learning methods, using tools such as WhatsApp, SMS, and printed materials. This approach allowed them to reach all students, even those in remote areas. Similarly, Kundu and Bej (2021) found that teachers became more creative in designing digital content that consumed less data but still supported active learning. These findings highlight that the digital divide has encouraged teachers to think critically and use available resources more efficiently.

2. . Students' Resilience and Digital Literacy

    Students also demonstrated strong resilience and adaptability during periods of limited connectivity. According to Miah (2023), many students learned to manage their study schedules independently, practiced self-discipline, and developed better time management skills. This independence has led to increased confidence and responsibility in their learning process. Moreover, the necessity to

use digital tools even in a limited way improved their digital literacy skills, which are essential for future employment and lifelong learning (UNESCO, 2021).

3. Collaboration and Community Support

Another positive impact of the digital divide is the rise of collaborative efforts among teachers, students, parents, and local communities. Rahman et al., (2022) found that school communities began to work together to overcome barriers by sharing resources, such as internet data packages and devices. These acts of collaboration built stronger relationships and created a sense of collective responsibility in education. Dabie (2025) also emphasized that this cooperation helped maintain students' motivation and emotional well-being during times of digital hardship.

4. Educational Transformation and Policy Implications

Beyond individual adaptation, the digital divide has inspired system-level transformation. Governments and educational institutions have begun to recognize the importance of equal access to digital resources (OECD, 2020). This awareness has led to programs that support teacher training in digital pedagogy and the provision of affordable internet access for students in rural areas (van Deursen & van Dijk, 2019). These initiatives mark a shift from viewing the digital divide merely as a problem to understanding it as a catalyst for educational change.

5. . How the Digital Divide Encourages Good Changes

Even though it seemed like a big problem at first, the digital divide has surprisingly caused many good things to happen. Teachers are showing more creativity, students are learning to depend on themselves more, and people in the community are understanding each other better. UNESCO said in 2021 that this change matches the plan to build a more adaptable education system for the future. We think this situation has two sides: one side showing problems, and the other showing opportunities. Also, we feel that these opportunities appear mainly because of situations that force everyone to adjust.

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The Findings

The findings from the reviewed literature indicate that the digital divide has a multidimensional impact on the teaching and learning process. Although limited access to digital technology poses serious challenges, many studies reveal that this condition also encourages positive changes in educational practices, particularly in terms of teacher innovation, student resilience, and collaborative learning environments.

Teachers' Adaptive Strategies in Low-Connectivity Contexts

One significant result is the ability of teachers to adapt their instructional strategies in response to limited digital access. Almeida and Silva (2022) explain that teachers in low-connectivity areas tend to simplify learning materials and focus on essential competencies. Rather than relying heavily on sophisticated online platforms, teachers utilize offline resources, printed modules, and low-data communication tools such as text messages and voice notes. This adaptation demonstrates teachers' professional flexibility and their commitment to ensuring that learning continues despite technological constraints.

In addition, Kundu and Bej (2021) report that teachers become more reflective in selecting teaching methods. They prioritize meaningful interaction and clear instructions over excessive content delivery. This shift helps students better understand learning materials and reduces stress caused by technological difficulties. As a result, the digital divide indirectly improves pedagogical awareness and instructional quality.

Students' Learning Independence and Resilience

The literature also highlights positive developments in students' learning behavior. Miah (2023) notes that students facing limited digital resources tend to develop self-directed learning skills. They learn to manage their time, complete assignments independently, and resilince.

Educational Transformation and Policy Implications

One major finding of this study is that the digital divide contributes to educational transformation. Limited access to digital technology encourages schools and educators to rething learning models that are heavily dependent on stable internet connections.

Teachers shift their focus from technology-driven intruction to pedagogicallydriven practice that emphasize flexibility, contextual learning, and essential competencies. This transformation reflect a movement toward more resilient and inclusive education systems (OECD, 2020).

How the Digital Divide Encourages Good Changes

in teaching and learning practice. Teachers become more innovative and independent in designing intructional strategies, while students develop resilince, self-directed learning skill, and problem solving abilities. In addition, collaboration among teachers, families, and communities, become stronger as stakeholders work together to overcome technological limitations. These positive changes changes indicate that the digital divide can function as a catalyst for growth rather than marely a barrier.

This section discusses the findings of literature riview by focusing on how the digital divide affects teachers and students', as well as how this conditions generates adaptive resfonses in educational practices. The discussion is organized into several key aspects to provide a clear and foccuses how the digital divide encourages positive chages.

CONCLUSSION

Based on literature reviews, the digital divide is often considered a major obstacle in education (Warschauer, 2018; van Deursen & van Dijk, 2019). After we looked at many different things, we realized the problems we talked about before are not only bad. Actually, these problems have often pushed teachers, students, and people in the community to find other ways to keep learning going.

Teachers have become more creative in how they teach, such as by using materials that don't need the intermet and methods that don't use much data (Almeida & Silva, 2022). We think that this new way of thinking can happen especially when teachers are in situations that are not ideal at all.

Meanwhile, students are also demonstrating increasing resilience and independence, as explained by Miah (2023). For us, students' ability to persist despite limited resources is an important value that doesn't always emerge in normal situations.

Furthermore, the digital divide also shows that education can be better when there is support from various parties. The collaboration between teachers, families, and

communities, as explained by Dabie (2025), made our realize that the learning process never occurs in isolation. The shared feeling that grew during this tough time actually helped schools and their communities become more connected. This situation also pushed leaders and schools to really think about making sure everyone had equal access to technology (OECD, 2020; UNESCO, 2021). We think the rule changes that came from this issue show that school systems need to be updated often to stay relevant.

In short, the tech gap not only showed problems in the school system but also opened doors to move toward education that is more adaptable, creative, and inclusive. From where we stand, this challenge reminds us that progress in education often happens when hard times force everyone to grow and change.

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