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Exploring the Nexus of Digital Divide, Equity, and Student Adjustment in E-Learning Environment

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ABSTRACT

The rapid advancements in digital technology have changed the teaching and learning process across the world. E-learning was once optional, but it is now essential to education after the COVID-19 pandemic. Institutions shifted the teaching and learning activities for continuing education into digital modes. This transformation created opportunities for flexible and innovative learning. However, it also resulted in significant challenges, including unequal access to the internet and digital devices. These challenges are called the digital divide, and this divide affects the students' educational, social, and psychological adjustment in digital learning environments.

***Keywords**: Digital Divide, Equity, Adjustment, e-Learning, NEP 2020, Online Education.*

Introduction

In the field of educational psychology, adjustment is recognized as a student's ability to cope with academic needs, create a healthy relationship in his social life, and manage emotions in critical situations. In traditional teaching-learning environments, teacher guidance, peer support, and intrinsic motivation play an important role in students' adjustment. However, in an e-learning environment, the focus shifts to access to technology, internet stability, and digital skills. Students with adequate devices, stable internet connectivity, and digital skills can adapt to the e-learning environment easily. However, whoever has not had these means faces problems, and it results in poor academic outcomes, feelings of isolation, and difficulties in handling the stresses and self-control. Research has revealed that digital access and competencies are key factors impacting the students' academic, social, and emotional adjustment in e-learning environments (Dhawan, 2020; Van Dijk, 2020).

The digital divide is a complicated and multifaceted problem. It consists of three levels: the first level is access to technology, which encompasses digital devices such as computers, tablets, smartphones, and reliable internet connectivity (Van Dijk, 2020; UNESCO, 2020). The second level is digital skills and usage; students may have access to digital devices but due to lack of skills cannot use them effectively for learning (Beaunoyer, Dupéré, & Guitton, 2020). The third level, which is not acknowledged as notable, is learning outcomes. Students with both access and skills may still face disparities in academic achievements due to socio-economic, cultural, or institutional determinants (Dhawan, 2020; Jena, 2020). All these components determinehow well students can manage an e-learning environment.

Equity in technology is an emerging issue in developing countries like India; the disparities are obvious between urban and rural students, private and government schools, and different socio-economic strata (Government of India, 2020; Jena, 2020). Due to a lack of digital resources and minimal digital literacy, some students meet challenges that limit their participation and create academic drawbacks along with feelings of denial (Dhawan, 2020). At the same time, students who have adequate

access to digital devices, the internet, and digital competencies can adapt to the e-learning environments easily and effectively. This increases the gap between empowered and marginalized students (Beaunoyer, Dupéré, & Guitton, 2020).

From this perspective, the aim of the article is to present a comprehensive review of the relationship between the digital divide, equity, and student adjustment in an e-learning context. It will investigate how

It will examine how inequitable digital access affects academic, psychological, and social adjustment and highlights policy and institutional responses. By collecting and incorporating the evidence from existing literature, the article provides ongoing discussions on creating inclusive, equitable, and sustainable e-learning systems that support the comprehensive adjustment of all students.

E-learning

E-learning contexts use digital technologies and internet-based platforms to deliver, support, and enhance teaching and learning (Dhawan, 2020; UNESCO, 2020). In e-learning online courses, blended learning, mobile learning, and virtual classrooms are key components. It is not only a tool to provide content to learners but also allows them to interact with people, receive multimedia instruction, and learn with freedom without any kind of limitation of time or place. Though, its success depends on students' equitable access to devices, stable internet connectivity, and desirable digital competencies (Beaunoyer, Dupéré, & Guitton, 2020; Van Dijk, 2020).

Adjustment

In the field of educational psychology, adjustment means the process of adaptation of academic, social, and emotional needs of students within an educational environment. It is commonly known in three dimensions:

- **Academic adjustment:** the ability to handle academic needs, such as study habits, time management, and performance expectations.
- **Social adjustment:** the capacity to establish and maintain relationships with peers and teachers, even in an e-learning environment.
- **Psychological adjustment:** the monitoring of emotions such as stress, anxiety, and motivation while adapting to new learning environments.

E-learning needs personal resilience with institutional support and equitable access to resources for an effective adjustment.

Digital Divide

The digital divide means inequitable access, skills, and outcomes related to digital resources. Researchers classify it into three levels:

- **First-level digital divide:** Inequalities in physical access to resources and internet connectivity.
- **Second-level digital divide:** Disparities in digital literacy and the ability to use technology effectively for teaching and learning purposes.
- **Third-level digital divide:** Differences in educational outcomes and favourable effects resulting from technology usage, often shaped by socioeconomic and cultural contexts.

From an e-learning perspective, these divides strongly affect the students' ability to adjust and perform.

Theoretical Perspectives

Several theories explain those factors which influenced student's adjustment in e-learning environments:

- **Bronfenbrenner's Ecological Systems** Theory highlights the various environmental layers of family, school, peers, and society, which play a key role in shaping the student's adjustment. Inadequate digital resources in the microsystem, such as at home or school, can directly influence the academic performances (Bronfenbrenner, 1979; Van Dijk, 2020).
- **Tinto's Model of Student Integration** focuses on the importance of academic and social integration for student constancy. Inadequate digital access can interrupt both forms of integration, reducing engagement and overall adjustment (Tinto, 2017; Crawford et al., 2020).

- **Equity** encompasses not only access but also learner empowerment, cultural relevance, and the meaningful application of technology (Warschauer, 2004; Beaunoyer, Dupéré, & Guitton, 2020).

All these frameworks indicate that adjustment in e-learning is not merely an individual responsibility but an integrated and systemic concern, closely connected to equity and the divide of resources.

The Digital Divide in Education

The disparity in students' access to technology, internet connectivity, and digital literacy is known as the "digital divide" in education (Van Dijk, 2020; UNESCO, 2020). In the current era, it has emerged as a significant factor affecting educational access and quality. E-learning can reach students across institutional and geographic boundaries, which could make education more inclusive, but its advantages are limited when students lack the devices, internet access, or skills necessary to participate successfully (Dhawan, 2020; Beaunoyer, Dupéré, & Guitton, 2020).

The digital divide occurs most simply as disparities in access to devices and trustworthy internet connections. According to studies, students from private schools, urban areas, and families with higher incomes are more likely to own smartphones, laptops, and high-speed internet, which enables them to engage in online learning with ease (ITU, 2021; Van Dijk, 2020). On the other hand, students from low-income or rural areas are less able to join live classes, download materials, or turn in assignments because they frequently rely on shared devices, have slow mobile data, or may not have access at all (Beaunoyer, Dupéré, & Guitton, 2020).

The digital divide encompasses disparities in digital skills and usage in addition to device and internet access. Strong technological competencies enable students to interact with interactive platforms, use digital resources efficiently, and explore learning management systems. On the other hand, people who haven't used technology much have trouble adjusting, which hinders their ability to learn (Van Dijk, 2020; Dhawan, 2020). Teacher readiness, school infrastructure, and parental education all usually have an impact on this second-level divide. For instance, children whose parents are not digitally literate might not get much help at home, which makes it harder for them to adjust to online education (Beaunoyer, Dupéré, & Guitton, 2020).

The third-level digital divide, which relates to inequalities in academic performance and the advantages that students derive from technology, constitutes a smaller but equally important factor. Socioeconomic and cultural factors affect how well students can use devices and digital skills for both academic success and personal growth, even when they have access to them (Van Dijk, 2020; Warschauer, 2004). For example, marginalized students might find it difficult to use digital tools for collaborative problem-solving, critical thinking, or complex learning tasks, which would reduce their educational gains from e-learning (Beaunoyer, Dupéré, & Guitton, 2020).

These disparities were disclosed by the COVID-19 pandemic. Over 1.6 billion students were impacted by closings of schools globally, according to UNESCO (2020), and many of them were unable to successfully switch to online learning because of access issues. Research shows that while rural learners in India faced numerous obstacles, such as limited devices, poor connectivity, and financial limitations, which caused some to discontinue virtual learning, urban students in India adjusted more readily (Government of India, 2020; Jena, 2020). These differences hinder students' overall adaptation to digital learning environments and maintain already-existing educational disparities.

As a result, the digital divide is a social and educational equity issue rather than just a technology one. It has a direct impact on the ability of learners to adapt educationally, socially, and emotionally in online learning environments, leading to uneven experiences and results. In order for e-learning to deliver on its promise of providing inclusive, high-quality education for everyone, it is essential that this divide be addressed (Dhawan, 2020; Van Dijk, 2020).

Academic Adjustment and Inequity

According to Baker and Siryk (1999), academic adjustment is the capacity of students to cope with the cognitive and organizational needs of their learning environment, including creating productive study habits, effectively managing their time, and attaining satisfactory academic results. Having access to technology and digital skills are closely related to academic adjustment in online learning. Pupils can use digital resources to enhance their learning, turn in assignments on time, and actively participate in online classes if they have reliable devices and consistent internet. On the other hand, students who

suffer from by the digital divide frequently find it difficult to meet academic standards, which results in disparities in their performance (Dhawan, 2020; Van Dijk, 2020).

Learning continuity is severely restricted by limited access to digital infrastructure. Students who lacked personal devices or reliable internet during the COVID-19 pandemic were unable to participate in live classes or turn in assignments, which had a negative impact on their academic performance (Dhawan, 2020). Higher absenteeism, decreased engagement, and, in certain situations, learning withdrawal were all influenced by these disparities. At the same time, students who had better access could use extra online resources like tutorials, educational apps, and digital libraries, which made the gap in academic performance even bigger (Beaunoyer, Dupéré, & Guitton, 2020).

Another important component affecting academic adjustment is digital literacy, which includes the capacity to use learning platforms, handle data, and interact with others in digital settings (Ng, 2012). In e-learning environments, students who possess greater digital skills usually show improved self-control, time management, and problem-solving abilities. Disparities in digital literacy, however, which are frequently connected to socioeconomic status and school infrastructure, pose serious academic obstacles for students from marginalized communities (Van Dijk, 2020). For instance, first-generation and rural students often lack the support and training necessary to quickly adjust to online platforms, which hinders their academic progress.

Studies show that existing disparities in academic performance get worse by the digital divide. Students from underprivileged backgrounds suffered more learning losses during the pandemic than their more affluent colleagues, according to UNESCO (2020). Jena (2020) discovered that while rural students in India experienced extended disruptions that made academic adjustment particularly challenging, urban students in India were able to continue their education with little difficulty. The gap between high- and low-performing students has grown as a result of these differences, threatening long-term educational equity.

In a nutshell access to digital resources and competencies, in addition to individual effort, have an impact on academic adjustment in e-learning. While those impacted by the digital divide frequently experience discontinuity, disengagement, and poorer academic performance, students from well-resourced backgrounds are able to adapt and grow. These disparities show that specific initiatives and regulations are required to guarantee that every student has an equal chance to adapt academically to digital learning environments (Dhawan, 2020; Beaunoyer, Dupéré, & Guitton, 2020).

Psychological Adjustment and Digital Barriers

The ability to control emotions, handle stress, and stay motivated when adjusting to unfamiliar or difficult situations is known as psychological adjustment (Taylor, 2010). Psychological adaptation is crucial in e-learning to influence students' overall learning outcomes and experiences. However, digital hurdles like restricted access to technology, erratic internet connections, and a lack of digital skills frequently worsen stress, anxiety, and frustration, making it more challenging to adjust to virtual learning (Van Dijk, 2020; Dhawan, 2020).

Technostress, or technology-induced stress, is a prevalent psychological issue in online education. Students' mental health suffers as a result of frequent disruptions, trouble finishing assignments, and helplessness when they lack trustworthy devices or reliable connectivity (Sasidharan & Menon, 2021). The disparities brought about by the digital divide are highlighted by the fact that students who have access to sufficient digital resources report greater levels of confidence, motivation, and satisfaction (Beaunoyer, Dupéré, & Guitton, 2020).

Feelings of loneliness and social isolation are also made worse by unequal access to digital resources. Psychological well-being depends on social connectivity, and students who are unable to participate in peer interactions or online discussions because of connectivity problems frequently feel left out. According to research, students who use technology less frequently than their peers report feeling more socially isolated and having lower self-esteem (Brooks et al., 2020; Beaunoyer, Dupéré, & Guitton, 2020). This exclusion limits long-term adjustment to educational environments in addition to having an impact on emotional health.

Higher levels of academic stress and anxiety are also linked to the digital divide. Due to chronic stress and diminished resilience, students from underprivileged backgrounds frequently fear falling behind due to missed classes or unfinished assignments (Cao et al., 2020). Students who believe they are less capable than their peers who have greater access and digital skills experience even more stress,

which leads to feelings of inadequacy that have a negative impact on motivation and self-efficacy (Van Dijk, 2020; Dhawan, 2020).

On the other hand, students who have better access to digital resources can learn at their own pace, which helps them control their own behavior and feel like they have accomplished something. This shows that psychological adjustment is affected by both personal skills and systemic inequalities in digital access (Beaunoyer, Dupéré, & Guitton, 2020; Dhawan, 2020).

Summing up, psychological adjustment in e-learning is influenced by both internal coping mechanisms and external digital environments. Students who have trouble with technology are more stressed, feel more alone, and are less motivated. On the other hand, students who have equal access are more engaged, confident, and happy with their schoolwork. Thus, bridging the digital divide is crucial not only for academic achievement but also for facilitating students' overall psychological adaptation in e-learning environment (Van Dijk, 2020; UNESCO, 2020).

Social Adjustment and Digital Divide

Social adjustment in education means that students can make and keep good relationships with their classmates, teachers, and the rest of the school community (Baker &Siryk, 1999). In traditional classrooms, this adjustment happens naturally through daily interactions, group work, and social bonding. In e-learning, social engagement relies on online resources, and disparities in access to devices, access to internet, and digital literacy can lead to considerable inequities in students' social adaptation (Van Dijk, 2020; Dhawan, 2020).

Students who have regular access to the internet can take part in online discourse, group projects, and virtual communities. This helps them feel like they belong and are connected to others. These kinds of interactions help students work together, get along with their teachers, and learn together (Hrastinski, 2009). On the other hand, students who are hindered by digital barriers frequently neglect these social interactions. Poor engagement due to connectivity problems or insufficient devices can lead to exclusion within the online learning environment, which results gradually in feelings of isolation, loneliness, and social exclusion (Brooks et al., 2020; Beaunoyer, Dupéré, & Guitton, 2020).

The digital divide also has an impact on the quality of the relationships between teachers and students. Research demonstrates that proficient support from teachers and communication are essential for student adaptation and academic perseverance (Tinto, 1993). Nonetheless, students without access to technological resources may struggle to obtain immediate feedback, resolve issues, or develop significant connections with teachers, thereby affecting social integration and overall engagement in the learning process (Dhawan, 2020; Van Dijk, 2020).

Peer relationships, crucial for the growth of adolescents, are negatively impacted by imbalanced digital participation. Students who can actively participate in online discussions, forums, and collaborative responsibilities are more likely to maintain friendships and social connections, even in online spaces. On the contrary, learners with digital disadvantages frequently perceive themselves as disconnected from these interactions, which negatively influences their self-esteem and sense of belonging to others (Xie, Siau, & Nah, 2020; Brooks et al., 2020). These differences may make socio-economic divisions even stronger because students from wealthy families build greater social and academic relationships, while students from deprived backgrounds have a harder time integrating in.

The COVID-19 pandemic has shown these problems even more clearly. UNESCO (2020) says that a lot of students, especially those who live in rural or poor areas, had fewer chances to interact with their peers and participate in social activities while learning online. Research from India also shows that digital exclusion not only hurt their academic performance but also made it harder for them to participate socially (Jena, 2020; Dhawan, 2020).

In conclusion, social adjustment in e-learning relies not only on the individual communication skills of students but also on equal exposure to digital resources. The digital divide negatively affects relationships between peers, interactions between teachers and students, and students' overall sense of belonging. This creates social inequalities that are similar to academic and psychological inequalities in online education. To create e-learning communities that are open to everyone and help everyone, it is important to bridge this gap (Beaunoyer, Dupéré, & Guitton, 2020; Van Dijk, 2020).

Policy and Institutional Responses

As the digital divide in education grows, governments, international agencies, and schools have all initiated different policies and programs to make sure that all students have equal access and can adjust to e-learning environments. These efforts show that fixing digital inequalities is not just a

technological issue, but is also associated with issues of social justice and making sure everyone can learn (Van Dijk, 2020; Dhawan, 2020).

Organizations like UNESCO, UNICEF, and the World Bank are pushing for adequate digital infrastructure on a global scale. For example, UNESCO (2020) suggested a "Global Coalition for Education" to help countries keep children from falling behind in school during the COVID-19 pandemic. UNICEF (2021) also started the Giga initiative, which aims to have every school connected to the internet, especially in countries with low or middle incomes. The above actions show that a lot of money needs to be spent on digital infrastructure so that students can adapt well to e-learning environments (Beaunoyer, Dupéré, & Guitton, 2020).

In India, there have been a number of efforts to bridge the gaps in digital access. The Digital India program and the National Education Policy (NEP) 2020 highlighted the use of technology in schools, encouraging digital literacy and making online learning resources available to everyone (Government of India, 2020; Jena, 2020). The Ministry of Education started PM eVIDYA during the pandemic. It was a multifaceted program that sent educational content to students who didn't have internet access through television, radio, mobile apps, and online platforms (MHRD, 2020). These efforts aimed to promote equality by providing a variety of learning opportunities.

At the institutional level, schools and universities used blended learning strategies to help students who didn't have sufficient internet access by combining online and offline methods. Some schools lent laptops or tablets to students who needed them, while others set up community learning hubs where people could share devices and use the internet (Beaunoyer, Dupéré, & Guitton, 2020). Moreover, teacher training programs were augmented to improve educators' digital pedagogical competencies, thereby facilitating students' academic and social adaptation in e-learning settings (Dhawan, 2020).

Despite these efforts, there are still big problems. Research indicates that numerous policies predominantly focus on the first-level digital divide—access to devices and the internet—while the second- and third-level divides, concerning digital skills and educational outcomes, are inadequately addressed (Van Dijk, 2020; Beaunoyer, Dupéré, & Guitton, 2020). For instance, the NEP 2020 highlights digital inclusion, but it hasn't been consistently put into action, especially in rural and low-income areas where teachers aren't ready and internet access is limited (Jena, 2020; Government of India, 2020). Additionally, numerous interventions overlook the psychological and social aspects of adjustment, which are as crucial as academic performance for promoting comprehensive educational success (Taylor, 2010; Brooks et al., 2020).

In conclusion, policy and institutional measures addressing the digital divide are vital to promoting equity in e-learning. However, to really help students adjust, these strategies need to go beyond just improving infrastructure. They also need to include teaching digital skills, using inclusive teaching methods, and providing psychosocial support. A holistic strategy that incorporates technological, educational, and emotional dimensions is essential for the creation of sustainable and equitable e-learning environments (Dhawan, 2020; Van Dijk, 2020; Beaunoyer, Dupéré, & Guitton, 2020).

Discussion

The literature regarding the digital divide and student adjustment underscores a multifaceted interplay of technological, academic, psychological, and social factors that shape learners' experiences in e-learning contexts. The shift to digital education has opened up new ways for students to learn that are more flexible and accessible, but it has also made existing inequalities worse, especially for students from low-income families (Dhawan, 2020; Jena, 2020).

These studies found that the digital divide is more than just not having devices and internet access. Despite considerable policy emphasis on enhancing the infrastructure for technology (Government of India, 2020; UNESCO, 2020), deficiencies in digital literacy, technological competence, and the proficient utilization of digital tools persist, hindering students' capacity to fully capitalize on online learning opportunities (Van Dijk, 2020; Beaunoyer, Dupéré, & Guitton, 2020). This conclusion suggests the necessity for a deeper knowledge of equity—one that includes not merely access but also competencies, educational outcomes, and adaptability within digital learning environments.

The review also points out that students' adjustment to e-learning is not a universal adaptation. When students have trouble using online platforms, don't receive feedback quickly, or have trouble learning on their own, their academic adjustment suffers (Tinto, 2017; Dhawan, 2020). Digital fatigue, stress, and a lack of motivation are all things that can affect psychological adjustment. These problems

were especially clear during the COVID-19 pandemic (Xiong et al., 2020). Social adjustment difficulties arise from diminished peer interactions and the lack of informal assistance networks, which are essential for student success (Crawford et al., 2020). These findings collectively demonstrate that disparities in adjustment are interrelated throughout academic, emotional, and social settings.

Moreover, although institutional and policy initiatives have significantly contributed, they frequently emphasize short-term solutions. Programs like PM eVIDYA and UNICEF's Giga initiative (MHRD, 2020; UNICEF, 2021) focus on making things more accessible, but for the long term, we need to invest in teacher training, inclusive teaching methods, and mental health support systems (Beaunoyer, Dupéré, & Guitton, 2020; Dhawan, 2020). The lack of focus on second- and third-level digital divides indicates that structural inequities may endure unless interventions thoroughly tackle all aspects of student adaptation in e-learning contexts.

Theoretically, these findings correspond with Bronfenbrenner's ecological systems theory, which proposes that student outcomes are influenced by various, interrelated contextual layers (Bronfenbrenner, 1979). Digital inequities cannot be comprehended exclusively at the individual level; they develop within familial, institutional, and societal environments. Therefore, policies aimed at bridging the digital divide must implement a systemic framework that encompasses the allocation of resources as well as the cultural, psychological, and social aspects of learning (Van Dijk, 2020; Dhawan, 2020).

The review also points out that there isn't enough research that looks at things over time or compares them. A lot of the evidence we have now comes from the COVID-19 pandemic, which is a crisis-driven situation for digital learning. There are still questions about how students adapt to e-learning over long periods of time, how this adaptation varies among cultural and socio-economic contexts, and how social disparities change as technology improves. To create long-lasting, fair digital education models, we need to fill in these gaps (Beaunoyer, Dupéré, & Guitton, 2020; UNESCO, 2020).

In conclusion, attaining equity in e-learning demands more than merely closing the digital divide; it requires the promotion of comprehensive adaptation. If educational technology doesn't help with learning, feelings, and social needs, it can make the gaps between students even bigger. To ensure that e-learning is a transformative and not an exclusive way of learning, policy, schools, families, and communities need to work together (Dhawan, 2020; Bronfenbrenner, 1979).

Conclusion

This review examined the interrelated relationships among the digital divide, equity, and adaptation in e-learning. It shows that students' access to technology, digital skills, and differences in their social and economic status have a big impact on how they do in school, how they feel, and how they interact with others.Digital learning has revolutionized education; however, its advantages are inequitably divided as students from underprivileged backgrounds encounter obstacles in accessing devices and internet connectivity, as well as in acquiring the necessary skills, confidence, and support for meaningful participation in e-learning (Van Dijk, 2020; Beaunoyer, Dupéré, & Guitton, 2020). To adjust well, you need more than just infrastructure; you need full support that includes academic scaffolding, mental health, and social connections (Dhawan, 2020; Crawford et al., 2020). Without this kind of assistance, digital education could make existing inequalities worse instead of better.

From a policy and research perspective, initiatives such as India's NEP 2020 and PM eVIDYA have enhanced accessibility (Government of India, 2020; MHRD, 2020); however, enduring solutions must also tackle the second- and third-level digital divides—skills, usage, learning outcomes, and long-term adaptation (Van Dijk, 2020). To achieve this goal, we need to allocate money on teacher training, teaching that includes everyone, and assisting students who are at risk. Furthermore, subsequent research needs to employ longitudinal and cross-cultural methodologies in order to clarify the evolution of students' adjustment to e-learning over time and to integrate digital equity into reforms to education (Xiong et al., 2020). Bridging the digital divide is not just a technical problem; it is also an educational, psychological, and social one that needs a comprehensive, systemic approach to make sure that online learning is truly open to everyone and works well.

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