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The Silent Divide: Digital Inequality and its Impact on Academic Performance in Hybrid Learning Environments

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Abstract

The aim of this study was to investigate the effect of digital inequality on academic achievement of the students of universities in hybrid learning model in District Dera Ghazi Khan in the context of Pakistan. The study employed a quantitative cross-sectional type of study design and obtained data from 300 student of the university by using structured questionnaire. Digital access, availability of internet, digital literacy, self-efficacy, institutional support and academic performance were assessed. The results indicated that digital inequality was significantly related to students' academic performance. Four factors were found to impact learning performance, such as digital literacy, digital self-efficacy, internet access and institutional support. It emphasizes the necessity of improving the digital infrastructure, skill development programmes and support systems to make hybrid learning opportunities inclusive.

Keywords: Digital inequality; Hybrid learning; Digital literacy; Academic performance; Digital divide.

Introduction

Digital technologies have had a profound impact on the way that pupils learn, interact with their instructors and access information, as well as learn and demonstrate learning. The learning management systems, videoconferencing systems, digital libraries, online assessments, cloud-based collaborative applications, artificial intelligence applications and mobile learning tools are no longer additional options in education, but rather basic tools used in delivering education in the modern age. This change is an element that has helped to spread the use of hybrid teaching, in which face-to-face education is planned in a conscious way alongside synchronous or asynchronous technology mediated education. The hybrid learning model can be flexible, continuous, provide broader access to learning materials, provide learning personalization and provide increased autonomy for learners. But the benefits of these are not equally shared. Students will have very uneven start points when they enter hybrid learning environments, in terms of internet connection, digital competencies, financial resources, social support, study space, confidence and institutional support to access digital resources. This flexibility can lead to a sense of being left behind, exclusion, and anxiety for others, depending on their learning model, and may result in academic disadvantage (Gudoniene et al., 2025; Hussain et al., 2024; Perveen & Hussain, 2023; UNESCO, 2023).

The unequal access, use and benefits from digital technologies will be referred to as the silent divide. There is a lack of voice from the divide because it is often masked by seemingly universal signs of access. A student might be able to get a smartphone, internet and an account on an institutional learning platform, but not be able to participate effectively in hybrid learning. The machine might be

out of date, used by other members of the family, not be compatible with the software needed, or not be appropriate to write long assignments. Internet access might not be continuous, cost prohibitive, have low data limits, or be slow enough for live videoconferencing and multimedia content. Pupils may also not have the practical and critical skills to seek out trustworthy information, resolve technical issues, secure their personal data, work collaboratively online, organize their information digitally or regulate their learning independently. Inclusion through digital technology does not just happen because we have a device or Internet access; it must be achieved through the process. This needs to be considered within the context of the quality, affordability, autonomy, skills, support and educational outcomes of technology use (Hussain & Khoso, 2021, 2022; Hussain & Abbas, 2023; Deng & El Hag, 2024; Mirazchiyski, 2025).

This is a common issue across the globe in the connectivity landscape. In 2025, while it was estimated that about six billion people were connected to the internet, around 2.2 billion people were still not connected, with most of these being in low- and middle-income countries. There are significant disparities in connection quality, connection affordability, geographic distribution, and digital skills and meaningful use across even connected populations. Students are expected to not only connect but download large files, attend live classes, access digital libraries, take online tests, join discussion forums, produce multimedia content and communicate regularly with both teachers and fellow students in these disparities in the education context. So, the more people get online, the more people do not become equally engaged in education on the web. In order to be educational, connectivity must be reliable, independent, safe and productive (International Telecommunication Union [ITU], 2025; UNESCO, 2026; Hussain & Bhatti, 2024).

Such inequities are especially significant in the context of hybrid learning as a significant amount of learning is being conducted outside the classroom. Typically, in a traditional school setting, the students have access to the same teacher, same school building, same schedule, and access to traditional school supplies. The learning context in the hybrid environment, however, is to a certain degree reliant upon the student's personal setting, personal gadgets, internet service, family obligations, technical skills and self-regulated learning. With the support of personal laptops, stable broadband, quiet study areas, supportive families, prior experience with learning platforms, and good self-regulation, students can benefit from hybrid learning to review lectures afterwards, communicate with teachers, get additional materials, and have flexible ways to work. Pupils who do not have them may not have access to live lessons, may find it hard to watch the lessons, may be unable to complete coursework in time, may have to use shared or public internet connections, and may spend too much time troubleshooting technical issues. It is important to take care of social and educational inequalities before and during the design of hybrid learning, as these inequalities can be reinforced and reproduced by the learning process itself (Tang et al., 2025; Hussain et al., 2025; Hussain et al., 2024; Van de Werfhorst et al., 2022).

In the modern era, the importance of the multi-faceted nature of digital inequality is increasingly recognized in the light of contemporary scholarship. Access to materials – availability and quality of internet access, computers and smartphones, software, electricity, assistive technologies and appropriate study environment – is the first level digital divide. The second level distinction lies with the differences in digital skills, self-confidence, digital use patterns, independence, information literacy, technical problem solving and ability to use digital resources for academically productive purposes. A third level, or 'outcome' level, is about inequities in the outcomes that people can experience in relation to technology, such as academic success, retention, further study or progression, employability, social participation and access to future opportunities. These dimensions are dependent on each other. Lack of access to materials limits the opportunities to practice the digital skills; restricted use of the digital skills reduces productive use of technology and unproductive or constrained use reduces the chances that digital participation will lead to positive academic outcomes. Mirazchiyski, therefore, suggests thinking of educational digital inequality as a continuum rather than technology "haves" and "have-nots," with reference to the quality of access to technology, computer and

information literacy, personal characteristics, motivation to use technology, and social and cultural and economic capital.

There are cases that illustrate this extended picture and that indicate the need for such an interpretation from the underserved populations in the University. A mixed-methods research conducted with 220 students at a minority-serving public university (MSPU) by Deng and El Hag (2024) revealed two types of digital barriers: first and second level. Students mentioned unreliable internet, lack of computers or computers that were outdated/susceptible to issues, software/hardware issues, and not being able to use institutional platforms. Slow internet was the most commonly cited challenge and impacted synchronous teaching, assignment completion or timed online assessment. Not only did the disadvantages faced by students not stop at technology, but they were also a significant part of the problem. Employment duties, caregiving tasks, sharing of devices, lack of study space, and confusion about instructions and delayed feedback from teachers, along with technical problems, were intertwined. The result shows that digital inequality is deeply rooted in the students' broader socio-economic and domestic context in the context of hybrid education. Academic disadvantage may not be due to a lack of motivation or ability but because they have to spend more of their time, money, emotional energy and organization to learn than the more well-resourced students.

The socioeconomic divide is thus at the core of the understanding of the silent divide. Household income impacts whether or not students are able to afford purchasing a suitable device, repair damaged equipment, maintain broadband subscriptions, purchase additional data, or subscribe to required software or create a quiet learning space. The ability to connect, to network, the supply of electricity and the availability of institutional facilities depend on geographic location. Parent education and experiences of family digital technology use can impact the family's technical and academic assistance. Students may be employed and/or have caregiving obligations that limit their class attendance time or use of a shared device in a synchronous class. When platforms, digital documents, recordings, assessments or communication tools are not accessible, they can provide for additional exclusion for individuals with disability. Household expectations, control of digital devices, safety and unpaid household work can also be linked to gender. Hence, digital inequality is not a distinctly technological issue, but rather a process in which the existing social inequality is being carried over to digital learning environments (Tang et al., 2025; UNESCO, 2023).

These differences are directly and indirectly related to academic performance. Direct effects can happen if students are not able to attend because of poor connectivity, if devices are incompatible and cannot be used to complete online exams, if students are unable to download the resources, or if they are unable to submit an exam due to technical issues. The indirect effects are through decreased engagement, decreased attention, decreased confidence, decreased interaction, stress, digital fatigue and decreased sense of belonging. If students are encountering technical issues multiple times, they might be less inclined to engage in discussions, shun more advanced digital activities or feel less competent in the classroom. Failure to conduct sessions simultaneously may limit access to explanations, feedback, peer interaction and/or question asking opportunities. Time available for studying and completing assignments could be shortened due to time lags in accessing materials. These experiences can impact on grades, assessment scores, attendance, course completion, and retention and progression over time. Digital inequality is, therefore, more than just access to educational resources, it's also the opportunity to access conditions that help to sustain this academic engagement. There is empirical evidence recently that supports the link between digital competence and academic achievement. Zakir et al. (2025) discovered that students' digital literacy was significantly and positively correlated with the students' academic performance, and also had a positive influence on their digital competence, digital competence for online learning, and engagement in informal digital learning. They have found that digital literacy has a direct impact on achievement as well as through facilitators that help students to be confident and independent users of technology. Likewise, Song et al. (2025) analyzed the 312 undergraduate students, and concluded that academic achievement is positively correlated with digital learning competence. This research indicates that "just" access to technology doesn't create the educational value. Students need to be able to assess information, use

digital tools, interact through the internet, troubleshoot technical issues, control their behavior and choose technologies to achieve specific learning objectives (Song et al., 2025; Zakir et al., 2025).

It has been more and more recognized in recent research that the learner's autonomy and his/her self-regulation are even more important. The study conducted by Ko (2026) on 432 undergraduate students showed that digital learning competence could explain the academic outcomes directly and indirectly via the informal digital learning engagement. Metacognitive self-regulation contributed in developing students' ability to transform digital competence into productive students' learning behavior. This is a very important finding to consider for hybrid learning, as students will often be required to plan their own study times, check for understanding, find the right source, be able to deal with distractions, ask for support and assess their learning when they are not in the presence of an instructor. Students who have similar devices and internet access can then get varying results due to their own self-regulation, self-confidence and their past learning experiences as well as their ability to use the internet to make a meaningful contribution to their learning. The gap in agency, or unequal ability to control, organize and profit from digitally mediated learning (Ko, 2026), is also considered an aspect of digital inequality.

But it's not always a positive link between technology and academic achievement. Learning is not better if students are able to have access to more devices or for longer durations. Wang et al. (2024) conducted a meta-analysis of 48 empirical studies to gain a clearer understanding of how digital-device use relates to academic performance, which they found to be dependent on the type of digital device, use purpose, duration, and location and pattern of use. There is a difference between educational use, which can help to achieve, and recreational, overuse, distracted, or poorly-controlled use, which can distract from achievement and performance. Evidence from OECD also shows that there are potential benefits from moderate and purposeful use of digital technology for learning, but that there are negative consequences when such technology is used in excess or for distractive purposes. It's significant to note that "digitally disadvantaged" students don't just use less technology. They may not be as having as much control over when, where, why and how technology is used. A student using a smartphone might need to do academic tasks on the same mobile device that provides social communications, entertainment service, family communications, and job messages. The issue is not only about how much technology is being used, but also, how high the quality of the technology is, the purpose for which it is being applied, the levels of autonomy in its use, and the learning conditions created by it (OECD, 2024; Wang et al., 2024).

The ability to implement pedagogical design and institutional capacity also influence the extent to which inequality is exacerbated or mitigated by hybrid learning. Well-designed hybrid learning is not just uploading material to the Internet or having both in-person students and virtual students attend the class at the same time. It involves careful planning and integration of learning goals, in-person experiences, online resources, online discussion, evaluation, feedback, learning accessibility, and student support. Gudoniene et al. (2025) carried out a systematic review to identify the core factors associated with the effective integration of hybrid education. They identified technological infrastructure, staff competence, pedagogical adaptation, learner engagement, institutions support and equitable access, as the key conditions for the effective integration of hybrid education. The assumption that all students have appropriate devices, stable Internet connections, and sophisticated digital literacy or that their learning space is quiet, can inadvertently benefit already privileged students. Technological differences can become a detriment in the classroom, especially when the difference involves high bandwidth video, rigid synchronistic attendance, timed testing, inaccessible documents, multiple disconnected platforms, and unclear communication.

On the other hand, using a design that is fair can lessen some of the disadvantages. Lectures which are recorded and/or downloadable can help students who are having connection problems or time limitations. For participation to increase, there are alternatives that can be used with low bandwidth, mobile-friendly materials, captioning, transcription, more time to submit, more ways to access the document, offline support and various communication channels. Differences in material access and competence can be resolved through device loan programmes, Internet subsidies, campus study

spaces, technical support, Digital-skills training, peer mentoring and early diagnostic assessments. The quasi-experimental study by El Messaoudi (2024), which was conducted with undergraduate students, found a significant increase in the digital literacy of the students when integrating a blended learning while observing a large observed effect size. This implies that digital competence should not be considered as a personal characteristic, or even an automatic consequence of learning, which the student must acquire individually. Can be developed in curriculum integrated and supported learning experience. Institutions can thus shape and are responsible for the impact of digital differences on academic inequality.

Although there is increasing literature, there are still a number of gaps in understanding and conceptualization. First, there has been a continued focus on access, rather than the quality, autonomy, purpose, skills and outcomes of technology use, in much of the research into the digital divide. Secondly, research often confuses the notions of the digital divide, digital inequality, digital literacy, and digital competence, thereby making it hard to compare study results. Thirdly, much of the current evidence was produced during the COVID-19 pandemic when schools had to deliver remote learning at a time when they had not been used to doing this before. The way teachers planned, taught and supported students in emergency online teaching varied from the deliberate hybrid learning design in the post-pandemic context with emphasis on preparation, pedagogy, institutional support, and students' expectations. Fourthly, an increasing number of studies focus on digital conditions or on academic outcomes, but fail to test the mechanisms between the two. Tang et al. (2025) have highlighted infrastructure and sociodemographic issues as the focus of the literature, with only a small number of experimental studies and those with theoretically integrated research. Conceptual ambiguity and lack of consideration of the educational implications of the various types of digital inequalities are also among Mirazchiyski's (2025) findings.

Another restriction is that students are considered a uniform group. Digital disadvantage can vary by income, country of residence (rural or urban), disability, gender, age, field of study, employment status, first-generation status, language background, migration experiences, and level of study. A lack of technology can also differ depending on the academic activity or task. While it may be enough to read the announcements on a smartphone, it may not be enough to do statistical analysis, coding, graphic design, laboratory simulation or long academic writing. Likewise, if the course is asynchronous, the lack of connectivity will only cause some disruption; but if the course calls for live discussion, oral presentations, virtual lab, or timed exams, it will cause a major disruption. Research needs therefore to be more detailed than the simple distinction of "connected" and "unconnected" students, and focus on how specific digital tools and resources relate to specific pedagogical needs and student contexts.

In this context, the proposed study, *The Silent Divide: Digital Inequality and Its Impact on Academic Performance in Hybrid Learning Environments*, takes the stance of exploring digital inequality as a multi-faceted educational process as opposed to just an access issue. It aims to explore the roles of device adequacy, connectivity, cost, digital literacy, self-efficacy, learning autonomy, institutional support, the availability of devices and the home-learning conditions on the participation and learning outcomes of students. There are several factors to take into account when assessing academic performance and these should include grade, assessment, assignment completion, attendance, engagement, persistence and students' perception of their ability to meet course requirements. Discussing these connections can offer an insight into the extent to which digital inequality impacts on achievement, as well as the extent to which it has a stronger impact when learning happens in a hybrid way, and on whom.

This investigation is significant not only in terms of the provision of technology. As the learning environment becomes more digital, and learning outcomes become more reliant on out-of-classroom resources and skills, education may become more dependent on factors of the digital environment than on academic ability. Relying on the concept of digital inequality as an individual problem can further drive the problem of institutional and structural responsibilities. If a student is missing a class due to an unstable broadband connection, failing an online assessment due to an outdated device, or

turning in work late due to the sharing of technology, the student may be assessed on the class in the same way as a fully connected student, despite the many differences in how the two students are being assessed. It is therefore crucial to grasp this silent divide, in order to design hybrid-learning policies, practices, assessment systems and student-support systems that foster substantive rather than just formal equality.

Statement of the Problem

Although hybrid learning is being adopted by all education institutions with great speed, there is still a lot of inequity in terms of students' access, use and benefits from digital technologies. While hybrid learning is designed to increase flexibility, accessibility and continuity in learning, students are not provided with equal technological, economic, social or environmental conditions in which to engage in learning. A number of students have poor internet connectivity, access to suitable digital devices (often shared), lack of digital literacy, high data costs, poor home learning environments, and lack of technical and institutional support. These barriers may limit synchronous class attendance, access to digital learning material, online discussions, timely assignment submission, communication with the teacher, and technology-based assessment. Yet, there is a lack of attention to the "quality" and "affordability" of the internet, the digital competence and self-efficacy of users, and to the possibility of making technology use relevant to academic outcomes, in measuring digital inequality, beyond checking for the possession of a device or having internet access. For this reason, students who seem to be "digitally connected" may be facing disadvantages that they are unaware of, which could be negatively affecting their engagement, motivation, confidence, retention and academic outcomes. Research on the effects of multidimensional digital inequality on learning performance in the context of deliberately created hybrid learning spaces has also been limited and often centered on emergency remote education and/or general online learning. In addition, there is little focus on the synergy between the students' socio-economic status, digital competencies, home learning environment, institutional support and the design of courses. Hence, the extent and nature of digital inequality in hybrid learning environments need to be investigated, as do learning conditions, digital skills, digital support, and unequal access to learning, and how all this impacts students' learning outcomes. Improving this is crucial to creating equitable instructional practices, assessment systems, and digital-support services, as well as institutionally designed policies, to support hybrid learning that extends and does not reinforce or exacerbate the social and academic inequities that currently exist in education.

Objectives of the Study

1. To measure the magnitude and scope of digital inequality of university students in hybrid learning environments
2. To investigate the association of Digital inequality with Academic performance of students of To investigate Universities of District Dera Ghazi Khan
3. To discover technological, socioeconomic and institutional issues that affect digital inequalities and students' learning outcomes.

Research Questions

1. What are the key areas and aspects of digital inequality among university students in blended learning?
2. How Digital inequality affects the academic achievement of university students in District Dera Ghazi Khan?
3. What are some important technological, socioeconomic and institutional factors that can promote digital inequality among university students?

Significance of the Study

1. This research aims to gain an understanding of the impact of digital inequality on academic achievement in the context of students' learning in universities in hybrid learning environments.

2. The results inform the process of building plans for improving digital access, skills and learning support for disadvantaged students at universities & policy makers
3. Digital equity is important to inclusive and effective hybrid learning environments
4. Research adds to the body of knowledge through the study of digital inequality issue of University students in District Dera Ghazi Khan
5. The findings can be used for future researches and educational policies that will help to minimize learning disparity with the use of technology.

Literature Review

Conceptual Understanding of Digital Inequality in Higher Education

In today's world of education, digital inequality has become one of the major problems because universities are incorporating digital technology into the educational field in terms of teaching, learning, assessment and academic communication. Contrary to the general digital divide conception which just focused on the disparity in access to computers and internet access, latest research on digital inequality views digital inequality as a multidimensional phenomenon of disparity in access, in competence in using digital technologies, in the quality of the technologies use and in autonomy, and in the educational outcomes of digital participation. There can be a digital divide between the levels of access to technology that students might have, but differences in their digital skills, confidence, learning strategies and access to systems and supports within their institutions can lead to different academic outcomes. So, digital inequality is not about access to digital resources, but also about the ability and opportunity to use digital resources as meaningful academic learning gains.

Recent studies have changed focus from technological availability to digital capability, which focuses on the technological knowledge, information literacy and communication skills needed to participate effectively in digital learning, as well as the critical evaluation and application of digital resources. A meta-analysis of 35 independent effect sizes was carried out by Li et al. (2025), which concluded that there was significant positive association between digital literacy and students' academic achievement. The results demonstrated that the learners with high digital literacy skills could manage the digital learning environment, access academic materials and obtain better learning outcomes. Moreover, the study revealed that the digital literacy-achievement relationship is different at various education levels, in various discipline contexts, and in different learning contexts; implying that digital inequality should not be analyzed as a universal phenomenon, but should be analyzed in the context of the education context.

In the same way, Chen et al. (2025) examined the pathways through which digital literacy affects academic outcomes of 894 university students. They found that digital literacy positively contributed to the academic performance by learning adaptation and online SRL. The study showed that the digital competencies of students helped them to adapt to the learning contexts mediated by technology and to autonomously manage their learning activities. The results of this study suggest that digital inequality has a relationship with achievement not only due to access issues but also because of the differences in how students adapt and regulate their learning behaviours in the digital environment.

Digital Access and Technological Resource Inequality among Students

Access to appropriate digital resources remains one of the fundamental dimensions of digital inequality in higher education. Although university students are often considered digitally connected due to widespread smartphone ownership, access through mobile devices does not necessarily provide equivalent educational opportunities. Effective participation in hybrid learning frequently requires reliable computers, stable internet connections, sufficient bandwidth, and access to specialized academic software. Students relying solely on smartphones may experience limitations when completing complex assignments, participating in virtual laboratories, analyzing data, preparing presentations, or accessing advanced learning platforms.

Deng and El Hag (2024) examined digital inequality among underserved university students and identified significant barriers related to device availability, internet reliability, technical problems, and affordability. Their findings demonstrated that students experiencing technological limitations faced

difficulties participating in online learning activities, accessing educational materials, and completing academic tasks efficiently. The study emphasized that digital inequality is closely connected with socioeconomic circumstances because students from financially disadvantaged backgrounds are more likely to experience device shortages, limited connectivity, and reduced opportunities for technology-based learning.

In the context of developing regions, these challenges become more pronounced due to unequal infrastructure development and variations between urban and rural communities. Students from rural areas may experience additional barriers, including weak network coverage, electricity interruptions, expensive internet packages, and limited access to institutional digital facilities. Consequently, the availability of digital technology does not automatically ensure equal educational participation because the quality and reliability of access determine whether students can effectively engage with hybrid learning.

Digital Literacy as a Predictor of Academic Achievement

Digital literacy is now an integral part of being an educated student, as learners are expected to engage in many learning activities online. They involve the use of scholarly information, assessment of online information, communication via electronic means, handling electronic documents, joining virtual discussion and use of educational software. While providing students with access to technology can help them benefit, those who are not well-versed in digital skills may not be able to take advantage of the technology.

Ali et al. (2025) studied the correlation between digital literacy and academic performance of University students in Pakistan. The study identified that digital literacy was an important factor in academic achievement: students' academic task completion ability, digital resource management ability and participation ability in technology-supported learning. The researchers suggested that digital skills development programmes should be established in universities, to build students' capacity to be engaged in digital education systems.

The findings by Chen et al. (2025) also showed the role of digital literacy in students' academic achievements, which enhances their learning adaptation and self-regulated learning (SLL) skills. More confident pupils with higher levels of digital competence were better able to use online resources and were better at organizing their own learning activities. This indicates that digital literacy acts as a mediator between technology access and academic success, and thus access to technology may not be a determining factor and can lead to academic gaps in students with similar access to technology.

Digital Self-Efficacy and Student Engagement in Hybrid Learning

Digital self-efficacy is defined as students' self-confidence to competently use digital technologies for learning. When blended learning is used, learners need to self-manage online platforms, solve technological issues, communicate online and self-organize digital learning tasks. Students who do not have digital self-efficacy may not use technology for activities, may be more frustrated when using technology and may be less engaged than students who feel more confident using technology.

Research has revealed that Digital confidence affects students' participation in online learning activities. Digital literacy is a self-assuredness among students that they can effectively use technology for learning that is more likely to drive the use of online resources, collaboration with peers and deeper learning. Other students with low confidence may need much outside support, and struggle to adapt to new and constantly evolving educational technologies.

Psychological factors therefore have an impact on the link between digital competence and academic performance. Digital inequality is more than just having technology; it's about students' perceptions of their success with technology. However, a lack of confidence can mean that students are not able to make the best of digital resources, which can have an adverse impact in hybrid learning environments.

Online Self-Regulated Learning and Academic Outcomes

Students have to take more responsibility for planning, monitoring and evaluating their learning processes in hybrid learning. Hybrid learning is different from the conventional classroom setting

where teachers supervise learning activities all the time; in the hybrid learning environment, students need to administer independent learning activities by using the digital media. Accordingly, SRL is an important factor which connects digital competence with academic achievement.

The online SRL had a significant mediating effect between digital literacy and academic achievement according to the findings of Chen et al., (2025). Pupils with more digital competence were able to effectively plan an online learning timetable, track their learning, find other sources of learning and carry out their work tasks independently. These results indicate that digital inequality has potential to impact achievement via student's ability for independent learning.

From this point of view, digital inequality is not just about having access to technology; students need more than that. They also require cognitive and behavioural abilities that are required for effective technology-supported learning. If these are not available, digital resources might not be used to their full potential, and therefore have limited educational value.

Institutional Support and Digital Equity in Higher Education

The digital inequality can be mitigated or exacerbated by the policies, infrastructure and support mechanisms of universities. Institutional support involves offering students learning management systems, technical support, digital training, on-line resources, and accessible learning material, as well as helping students with technical issues.

Studies have shown that academic and institutional preparedness and support is a critical factor that shapes students' digital experiences. Comprehensive digital training & technical assistance to students in universities can help them to overcome the barriers of technology more effectively. Conversely, schools that make the assumption that students will all have the necessary digital skills and tools to participate in the classroom may be unintentionally creating a disadvantage for students from less privileged groups.

Institutional strategies – beyond providing technology – are, therefore, necessary for digital equity. To achieve an equal benefit for hybrid learning, universities must take into account the issues of affordability, accessibility, skill development in digital, and ongoing support.

Digital Inequality and Educational Challenges in Developing Countries

Global access to educational technologies is starkly unequal, and issues of digital inequality are especially important in developing countries, where socioeconomic disparities have a strong impact on students' access to educational technologies. Despite the increased provision of digital learning opportunities in universities, there are still many barriers for students in terms of affordability of the Internet, devices, infrastructure and lack of digital training.

The shift towards online and blended education has been growing in Pakistan's higher education institutions, but there is a difference between the students from urban and rural areas. Children from low-income families might need to share devices, run out of mobile data or have an unreliable internet connection. These can have a negative impact on participation, learning and learning outcomes.

In the Pakistani context, it is important to carry out a more in-depth empirical investigation as digital inequality can vary across regions based on the infrastructure, socioeconomic conditions and institutional capacity. Research has shown that research on specific geographical contexts (e.g., District Dera Ghazi Khan) can yield useful data in the study of how contexts affect students' hybrid learning experiences.

Research Gap

While some research has already been undertaken in the areas of digital literacy, technology access and learning outcomes of online learning, there are several gaps in research. First, most of the existing studies have studied learners' learning in general online learning environments, but not investigated the hybrid learning environment that involves physical and online learning experiences. Second, some studies focus on the access to technologies while paying less attention to other factors that are correlated with technological access, such as digital competence, self-efficacy, institutional support and socioeconomic conditions.

Third, there has been less research that specifically looks at digital inequality among university students in the less-developed parts of Pakistan, especially the districts with varying differences between those in urban and rural areas where this disparity could have significant impact on learning. Last, not enough information is available on the interaction of various aspects of digital inequality and its collective impact on students' academic outcomes.

Hence, this study aims to fill up the above gaps and will explore the digital inequality in a multidimensional way and how it relates to the academic performance of university students of District Dera Ghazi Khan. The study also adds to the literature as it offers contextual evidence from a learning context in a developing environment and strategies for making hybrid learning more equitable.

Methodology

Research Design

The approach of this study was quantitative research with cross-sectional survey design based on the problem of digital inequality and its effect on academic performance which was faced by university students during the implementation of the hybrid learning system. The quantitative approach was used in the study because the study was designed to measure different aspects of digital inequality and statistically analyze the relationship between these different aspects of digital inequality with students' academic results. The cross sectional design allowed information to be gathered from the participants at one point in time to find patterns associated with digital access, digital competence, institutional support and learning performance.

Study Area and Population

The study was carried out with the students of the University in District Dera Ghazi Khan (Rawalpindi) of Punjab, Pakistan. The study area was chosen because it is a complex educational environment with a population of students from diverse areas (urban and rural) who pursue their higher education using traditional and technology-based learning methods. The participants of the study were students of both undergraduate and postgraduate degrees from universities where hybrid education was adopted using digital platforms, learning management systems, online classrooms, electronic learning resources, and so on.

The participants were students from various Higher education Institutions (HEIs) of District Dera Ghazi Khan namely Ghazi University, Dera Ghazi Khan, University of Education, Dera Ghazi Khan Campus, Ghazi National Institute of Engineering and Technology (GNIET), Dera Ghazi Khan and other affiliated Higher education Institutions (HEIs) of the district.

Sample Size and Sampling Technique

The total number of the students of the university who participated in the study was 300. Stratified sampling technique was employed to get appropriate representation of students according to different universities, academic disciplines, level of study and demographic characteristics. The participants had to meet the following inclusion criteria: be presently studying at a university and have prior experience of hybrid learning. Students who didn't have any experience with the digital learning activities were not included in the study.

The distribution of participants among selected universities is presented in Table 1.

Table 1

Distribution of Study Participants Across Universities in District Dera Ghazi Khan (N = 300)

University/Institution	Sector	Frequency (n)	Percentage (%)
Ghazi University, Dera Ghazi Khan	Public	150	50.0
University of Education, Dera Ghazi Khan Campus	Public	60	20.0
Ghazi National Institute of Engineering and Technology (GNIET), Dera Ghazi Khan	Private	45	15.0
Other Affiliated Higher Education Institutes, Dera Ghazi Khan	Public/Private	45	15.0
Total	—	300	100.0

Demographic Characteristics of Participants

Demographic details of respondents were collected and analysed to give insight into the composition of the respondents. Demographic data gathered consist of gender, age group, academic level, discipline, university sector, residential background and prior experience with hybrid learning.

Table 2

Demographic Characteristics of University Students from District Dera Ghazi Khan (N = 300)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	168	56.0
	Female	132	44.0
Age Group	18–22 years	182	60.7
	23–27 years	96	32.0
	Above 27 years	22	7.3
Level of Study	Undergraduate	214	71.3
	Master's	72	24.0
	MPhil/Doctoral	14	4.7
Academic Discipline	Sciences	92	30.7
	Social Sciences & Humanities	78	26.0
	Engineering & Technology	64	21.3
	Business & Management	38	12.7
	Other Disciplines	28	9.3
Institution Type	Public Sector University	220	73.3
	Private Sector University	80	26.7
Residential Background	Urban Area	118	39.3
	Rural Area	182	60.7
Hybrid Learning Experience	Less than 1 year	76	25.3
	1–3 years	168	56.0
	More than 3 years	56	18.7

Digital Access Profile of Participants

To explore digital inequality among students, the students were asked about having digital devices, internet availability, internet reliability, digital skills and institutional support. These indicators were thought to be necessary as access to technology is not enough to ensure meaningful participation in hybrid learning.

Table 3

Digital Access Characteristics of University Students in District Dera Ghazi Khan (N = 300)

Digital Inequality Indicator	Category	Frequency (n)	Percentage (%)
Primary Learning Device	Personal Laptop/Desktop	96	32.0
	Smartphone Only	142	47.3
	Shared Device with Family Members	62	20.7
Internet Access Type	Broadband/Wi-Fi	128	42.7
	Mobile Internet/Data Packages	136	45.3
	Limited or Unstable Internet	36	12.0
Internet Reliability	Reliable Access	112	37.3
	Occasionally Interrupted	134	44.7
	Frequently Interrupted	54	18.0
Digital Literacy Level	High	86	28.7
	Moderate	158	52.7
	Low	56	18.6

Technical Support Availability	Adequate Support	102	34.0
	Limited Support	148	49.3
	No Support	50	16.7

Research Instrument

The data were obtained by filling out a structured questionnaire after a comprehensive review of previous research on digital inequality, digital literacy and hybrid learning. The questionnaire consisted of four sections.

In the first section, demographic data such as gender, age, academic level, disciplines, type of university and residential background was collected. The second section quantified digital access indicators, such as owning a device, Internet access, affordability and reliability. The third part measured digital competence (digital literacy, confidence in the use of educational technologies, management of information in the web and technical problem-solving skills). The last part evaluated academic achievement indicators: student engagement, rate of attendance, completion of assignments, involvement in online learning activities, and evaluation of academic achievement.

Each statement was assessed with a 5 point Likert scale from 1 = Strongly Disagree to 5 = Strongly Agree.

Data Collection Procedure

Selected university students were selected for data collection by using structured questionnaires. Students' digital access was considered and efforts were made to ensure participation via online as well as physical means. Respondents were provided with information on the purpose of the study, the confidentiality of the data, and voluntary participation prior to the participation. Following informed consent, questionnaires were given and retrieved for further statistical analysis.

Reliability and Validity Assessment

To assess the reliability of the instrument of research the Cronbach alpha coefficient was used to get the internal consistency of the questionnaire items. The results were acceptable with values greater than 0.70 to ensure reliability. Content validity was achieved by having experts approve the content and by comparing it with previously validated instruments found in literature on digital inequality and technology-supported education.

Data Analysis

Data collected was analysed with the statistical software. Demographic and digital inequality characteristics were described using descriptive statistics such as frequencies, percentages, mean and standard deviation.

A Pearson correlation analysis was used to analyze the relationships between the digital inequality dimensions and academic performance. Moreover, this study employed multiple regression analysis to determine the factors of digital inequality that significantly explained students' achievement in hybrid learning environment.

Results

Demographic Characteristics of Respondents

The study was conducted with total 300 students of higher education institutions in District Dera Ghazi Khan. Demographic analysis revealed that 56% of the respondents were male ($n = 168$); and 44% of the respondents were female ($n = 132$). Most of the respondents were undergraduate students as their age group varied between 18-22 years (60.7%). As far as the academic level, 71.3% of the students were undergraduate students, 24% were Master's students and 4.7% were MPhil/Doctoral students.

Most respondents (73.3%) studied in public sector universities as compared to the private sector universities with enrolment of 26.7%. Regarding background of the students, a larger number of the students come from rural areas (60.7%) than from urban areas (39.3%) and the cross-sectional analysis of digital inequality should take into account geographical and socioeconomic differences.

Table 4
Demographic Characteristics of Respondents (N = 300)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	168	56.0
	Female	132	44.0
Age	18–22 years	182	60.7
	23–27 years	96	32.0
	Above 27 years	22	7.3
Academic Level	Undergraduate	214	71.3
	Master's	72	24.0
Institution Type	MPhil/Doctoral	14	4.7
	Public University	220	73.3
	Private University	80	26.7
Residence	Urban	118	39.3
	Rural	182	60.7

Distribution of Participants Across Universities

The distribution of the respondents showed that the maximum number of respondents was collected from Ghazi University (50 %), Dera Ghazi Khan Campus (20 %). The private sector institutions had 15% of students in the sample. This distribution conferred on the sample representation across the institutional settings and learning environments.

Table 5
Distribution of Respondents Across Selected Universities (N = 300)

University/Institution	Sector	Frequency (n)	Percentage (%)
Ghazi University, Dera Ghazi Khan	Public	150	50.0
University of Education, Dera Ghazi Khan Campus	Public	60	20.0
Ghazi National Institute of Engineering and Technology	Private	45	15.0
Other Higher Education Institutes	Public/Private	45	15.0
Total	—	300	100.0

Digital Access and Technology Availability Among Students

The results showed significant variation in the conditions of access to digital technologies amongst students. While most students indicated that they had access to digital devices, the quality of the device and appropriateness of the resources was widely varying. Nearly half of participants (47.3%) primarily used their smartphones as the learning medium for hybrid learning, while 32% used personal computers, either in the form of a laptop or desktop. Approximately 20.7% relied on shared devices, suggesting that some had a lack of independent use of digital learning materials.

In terms of Internet access, 45.3% of the students used mobile internet packages mainly and 42.7% had broadband or WiFi access. In addition, 18% of students had frequent interruptions with the Internet, indicating that reliability of Internet connection continues to be a challenge to participation in hybrid learning.

Table 6
Digital Access Characteristics of Students (N = 300)

Digital Access Indicator	Category	Frequency (n)	Percentage (%)
Learning Device	Personal Laptop/Desktop	96	32.0
	Smartphone Only	142	47.3
	Shared Device	62	20.7
Internet Type	Broadband/Wi-Fi	128	42.7
	Mobile Data	136	45.3

Internet Reliability	Limited Internet Access	36	12.0
	Reliable	112	37.3
	Occasionally Interrupted	134	44.7
	Frequently Interrupted	54	18.0

Descriptive Statistics of Study Variables

Descriptive analysis was carried out to define the overall level of the dimensions of digital inequality and academic performance indicators. This result indicates that students had moderate levels of digital access, digital literacy, institutional support and academic engagement.

Digital literacy had the highest mean score ($M = 3.61$, $SD = 0.72$) among all the variables, indicating that the students had some basic digital skills. The institutional support showed the lowest mean score ($M = 3.12$, $SD = 0.81$) and there are some difficulties with different technical support, training and the support of digital learning.

Table 7

Descriptive Statistics of Study Variables

Variable	Mean (M)	Standard Deviation (SD)	Interpretation
Digital Device Access	3.42	0.76	Moderate
Internet Accessibility	3.35	0.84	Moderate
Digital Literacy	3.61	0.72	Moderate-High
Digital Self-Efficacy	3.48	0.77	Moderate
Institutional Support	3.12	0.81	Moderate-Low
Academic Engagement	3.56	0.74	Moderate
Academic Performance	3.63	0.70	Moderate-High

Reliability Analysis

Cronbach's alpha was used to determine the reliability of the research instrument. The reliability of all the study constructs was acceptable with values above 0.70, which is the minimum acceptable value, indicating that there was satisfactory consistency among the items of the questionnaire.

Table 8

Reliability Analysis of Research Constructs

Construct	Number of Items	Cronbach's Alpha (α)	Reliability Level
Digital Device Access	5	0.82	Good
Internet Accessibility	5	0.85	Good
Digital Literacy	6	0.88	Excellent
Digital Self-Efficacy	5	0.84	Good
Institutional Support	5	0.81	Good
Academic Performance	6	0.87	Excellent

Correlation Analysis Between Digital Inequality Dimensions and Academic Performance

The academic performance of the participants did not show significant differences between the different gender groups. There was no significant difference in academic performance among gender groups.

Pearson correlation was used to analyses the correlation between digital inequality dimensions and academic performance. The results indicated strong positive correlations between all the digital related constructs and academic achievement.

Digital literacy ($r = 0.62$, $p < 0.001$) was found to show the strongest correlation with academic performance followed by digital self-efficacy ($r = 0.58$, $p < 0.001$) and internet accessibility ($r = 0.51$, $p < 0.001$). The outcomes show that there is a correlation of students' digital skills, connectivity and confidence with academic outcomes.

Table 9
Correlation Between Digital Inequality Dimensions and Academic Performance

Variable	Academic Performance (r)	p-value
Digital Device Access	0.46	<0.001
Internet Accessibility	0.51	<0.001
Digital Literacy	0.62	<0.001
Digital Self-Efficacy	0.58	<0.001
Institutional Support	0.49	<0.001

Multiple Regression Analysis Predicting Academic Performance

A multiple regression analysis was performed to find out the academic performance significant predictors. There was a statistical significance in the regression model ($F = 54.72$, $p < 0.001$) and the model explained 58.4% of the variance ($R^2 = 0.584$) in academic performance.

The findings showed that digital self-efficacy ($\beta = 0.27$, $p < 0.001$) and internet accessibility ($\beta = 0.21$, $p < 0.01$) were the next strongest predictors of academic performance, respectively, followed by digital literacy ($\beta = 0.34$, $p < 0.001$). Academic performance was also greatly assisted by the help of the institutions.

Table 10
Multiple Regression Analysis Predicting Academic Performance

Predictor Variable	β	t-value	p-value
Digital Device Access	0.15	3.21	0.002
Internet Accessibility	0.21	4.56	<0.001
Digital Literacy	0.34	7.12	<0.001
Digital Self-Efficacy	0.27	5.83	<0.001
Institutional Support	0.18	3.94	<0.001

Table 11
Model Summary of Multiple Regression Analysis Predicting Academic Performance

Model	R	R^2	Adjusted R^2	F-value	p-value
1	0.764	0.584	0.577	54.72	<0.001

The regression model showed a significant relationship between digital inequality dimensions and academic performance ($F = 54.72$, $p < 0.001$). The model explained 58.4% of the variance ($R^2 = 0.584$) in students' academic performance, while the adjusted R^2 value (0.577) indicated that the predictors accounted for approximately 57.7% of the variation after adjustment for model complexity.

Results of the Study

The Study's Results are divided into the following sections:

1. The data collected from 300 students from higher education institutions (HEIs) of District Dera Ghazi Khan, Punjab, Pakistan, is used to present the results of the study. The study highlighted the phenomenon of digital inequality among the students and its connection with the academic achievement of the students in a blended learning setting. The data obtained were analyzed descriptively, reliability, correlation analysis, and multiple regression analysis.
2. The demographic data showed that more male respondents (56.0%, $n = 168$) than female (44.0%, $n = 132$) participated in the study. The age group of the respondents who participated in the study was mostly 18-22 years (60.7 %), which means that those who were undergraduates formed the highest percentage of the respondents. As far as academic level is concerned 71.3% of the students were undergraduates, 24% were master's students and 4.7% were MPhil/doctoral students. Additionally, the majority of the participants were from public-sector universities (73.3%) rather than private-sector (26.7%). Students indicated that the majority of students (60.7%) had a rural residential background making the importance of studying digital inequality in this context significant because geographical factors may impact on access to digital learning resources.

3. Digital Access characteristics analysis found that students had access to different technology needed in order to complete their learning remotely. Almost half (47.3%) of the respondents said they learned using a smartphone, while only 32.0% had their own laptops or desktop computers. Also, 20.7% of students used shared devices, signifying that they were less able to have their own access to digital learning resources. In terms of internet connection, 45.3% of students relied principally on mobile data packages, and 42.7% on broadband or Wi-Fi. For this, while 18.0% reported that there were frequent disruptions in the internet, it was found that reliability of internet connection was still a major challenge that hindered effective participation in the hybrid learning activities.
4. The descriptive analysis of the study variables showed that the students' level of digital resources, digital skills and institutional support was moderate. Students' digital literacy had the highest mean score ($M = 3.61$, $SD = 0.72$) indicating that students' skills in using digital technologies for academic purposes is relatively higher. Academic performance had a moderately positive level ($M = 3.63$, $SD = 0.70$). The students' perception of the support they received in institutions had the lowest mean score ($M = 3.12$, $SD = 0.81$).
5. All the research constructs had acceptable internal consistency as demonstrated by the reliability analysis. Cronbach's alpha values were 0.81 to 0.88, which are slightly above the recommended value of 0.70. This revealed that the measurement tools had good reliability in measuring digital inequality dimensions and academic performance of the university students.
6. Correlation analysis was carried out to find the correlation between the dimensions of digital inequality and academic performance. The results showed that the academic outcomes were strongly associated with all the digital inequality factors. The academic performance was the highest association with digital literacy ($r = 0.62$, $p < 0.001$), digital self-efficacy ($r = 0.58$, $p < 0.001$), and internet accessibility ($r = 0.51$, $p < 0.001$). Overall, these findings suggested that the higher the digital skills, reliability and self-confidence of students in using digital tools, the better the academic outcomes in the hybrid learning model.
7. Multiple regression analysis was carried out in order to determine the important predictors of academic performance. Results of the regression model indicated that the model was statistically significant ($F = 54.72$, $p < 0.001$) with an R^2 of 0.584 that accounted for 58.4% of the variance in academic performance. Of the predictors, the most significant finding was that digital literacy ($\beta = 0.34$, $p < 0.001$) was the strongest predictor of academic performance, followed by digital self-efficacy ($\beta = 0.27$, $p < 0.001$), and internet accessibility ($\beta = 0.21$, $p < 0.01$). The support from the institutions also had a significant positive effect ($\beta = 0.18$, $p < 0.001$), indicating the importance of the support given by the universities when it comes to students' hybrid learning experiences.

Discussion of the Study

1. This study aimed to assess the impact of digital inequality in the context of academics performance of university students in hybrid learning model in District Dera Ghazi Khan, Pakistan. The results showed that digital inequality is still a big issue in student's learning, as there is inequality in access to digital devices, access to the internet, digital literacy, self-efficacy and the support of institutions. The findings indicated that digital inequality wasn't just a physical issue with access to technology, but also a digital issue in the effective use of digital technology for educational purposes. The results of this study reflect the current paradigm of the digital divide, which is viewed as a multidimensional issue with regard to access, skills, usage patterns and educational outcomes instead of a dichotomy of having or not having technology.
2. The results indicated that students' main learning tools were smartphone and to a lesser degree personal laptop or desktop computers. The findings show that for many students, being connected was a reality but their digital access was also of varying quality and suitability. A similar result was found by Deng and El Hag (2024) as they reported that the lack of adequate

devices, unstable internet connections, and technological limitations were obstacles to digital participation in online learning among the underserved university students. They pointed out that simply having a device does not constitute "digital inclusion" as it would be useless to students if they lack the technologies that can help them complete complex academic tasks. The present findings, however, further support this claim by showing that students in District Dera Ghazi Khan also had an unequal access to digital learning conditions, although with some degree of access.

3. Another finding from the study was that the Internet made a significant impact on students' academic achievement. Students who had a stable Internet connection had higher academic results than those with an unstable Internet connection. This is in line with Michikyan et al. (2025), who analyzed digital access, connectivity, digital skills and academic motivation among university students and found that academic experiences were uneven due to the differences in the quality of connectivity. They identified that many of these pupils had been experiencing a range of issues that compounded with one another and were often related: access to unreliable internet, insufficient engagement opportunities. As in the current study, access to the Internet has proven to be an important basis for learning in a blended learning environment, especially in areas where students are high users of online academic resources.
4. Digital literacy was one of the most significant factors related to student's academic outcomes found in this study. The Academic Outcomes of students with a higher level of Digital Literacy were more positive, as well as their engagement and their ability to participate in hybrid learning activities. The result is similar to the findings of Li et al. (2025) who conducted a meta analysis studying the correlation of digital literacy with the academic achievement. Their results showed that there are positive relationships between students digital literacy and educational performance, which means that students who are digitally competent can find information, manage digital resources, and adjust to the learning environment of digital technology successfully. The present research also finds an evidence of this relationship because it shows that digital literacy is a key factor in determining the ability of students to use technology tools in effective learning.
5. The findings of the positive relationship between digital literacy and academic achievement are also consistent with Zakir et al. (2025) who studied the relationship between digital literacy, digital informal learning, self-efficacy and academic achievement for students. Their research showed that the improvement in digital literacy resulted in better academic results due to better digital competence and involvement in learning. Likewise, in the present study, the confidence in the use of digital technologies (digital self-efficacy) significantly predicted academic performance, which means that students' self-efficacy in using digital technologies influences their benefit from the learning environment, in which they are hybrid. Students who perceived themselves as more "comfortable" in the digital world were more likely to be active users, access to academic materials and complete academic tasks using technology efficiently and effectively.
6. Another finding was that the academic achievement of the study was significantly positively influenced by institutional support. The students who felt that there was more technical support, computer access, and institutional guidance showed higher learning outcomes. This discovery strengthens the perspective put forward by Gudoniene et al. (2025) that technological infrastructure is not the only factor contributing to the success of hybrid learning as that would also rely on the readiness of institutions, teacher competence, support of learners, and suitable pedagogical design. They also found that institutions are key in contributing to the digital inequalities reduction, as they offer training, learning resources and ongoing support. The present results underscore the need to pay attention to institutional responsibility to ensure that hybrid learning does not negatively impact students with less digital experience.

7. The findings of the study also indicated that there were more rural students participating in the study and had more difficulties with access to connectivity and digital resources. This finding aligns with the general findings in the literature about geographical inequalities in digital accessibility. Tang et al. (2025) noted that socioeconomic status, as well as the difference in infrastructure and access to digital resources, play a significant role in influencing digital inequality in education. They found that students in less-developed areas typically will face higher barriers to online and hybrid learning resulting from lower access to digital technologies and fewer opportunities for digital skills development. This study adds to this conversation with evidence from District Dera Ghazi Khan where there is still a concern of rural–urban difference in the adoption of educational technology.
8. According to the regression analysis, digital literacy had the highest impact on academic performance followed by digital self-efficacy, internet accessibility and institutional support. The results suggest a more holistic approach than simply distributing devices and internet connections is needed to enhance academic achievement for hybrid learning. The results of this study were consistent with Chen et al. (2025), who discovered the impacts of digital literacy on the academic success that occurred in learning adaptation and online self-regulated learning. Their conclusions indicated that students need to be able to learn independently in technology supported learning environments and also access to digital tools. The present research corroborates this view as it demonstrates that students' skills and confidence in using digital opportunities make the difference with regards to how well they exploit them.
9. The results, however, also underscore that digital inequality persists, impacting educational opportunities even in the face of ubiquitous technology. This reinforces Mirazchiyski's (2025) call for a shift in the focus of digital inequality studies from a first level of access to a second level of considering differences in digital competencies, digital meaningful use and benefits of schooling. In the current study, the authors add to the growing knowledge by showing that digital inequality exists in a number of forms and with a multitude of factors—technological, personal, and institutional—interacting.
10. The results are significant for the higher education institutions. Universities need to not presume that students have equal digital skills just because they study in a digital environment. Rather, targeted digital literacy programmes should be implemented, internet support should be provided at low costs, access to appropriate learning devices be enhanced and technical assistance services should be set up in institutions. Special attention should be paid to socioeconomic and geographical inequalities that can hinder students' ability to engage effectively in hybrid learning in regions where these inequalities exist.

Findings of the Study

1. The study revealed that digital inequality had a significant impact on academic performance in hybrid learning environments with the university students.
2. There were many students who had a lack of exposure to digital equipment, reliance on cell phones and cell connectivity, and poor learning equipment.
3. Digital literacy came out as the most significant predictor of academic performance followed by digital self-efficacy, internet accessibility and institutional support.
4. 5. Students who are more skilled in their digital abilities, have access to reliable internet and increased institutional support had higher levels of academic engagement and better learning outcomes.
5. The results showed that digital inequality is a problem that transcends device access or internet connection and is manifested in the technological, socioeconomic and institutional aspects.
6. The study brought in attention to various activities that universities need to take up in terms of digital skill development programmes, enhancing the connectivity support, and creating equitable digital learning resources.

Recommendations of the Study

1. The universities should give disadvantaged children better Internet and appropriate devices that can be used on the Internet.
2. There is a need to introduce digital literacy and technology training programmes to boost students' confidence and digital learning skills.
3. Institutions should set up technical support services for students to help them overcome the digital learning difficulties.
4. Policymakers need to create policies, procedures, and practices to mitigate the effects of digital inequities for students from rural and low-income backgrounds.
5. Hybrid learning courses must be planned with flexible and accessible digital resources to cater for students' diversity.

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