

DIGITAL DIVIDE IN ONLINE HIGHER EDUCATION: GENDERED ACCESS IN GILGIT-BALTISTAN

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ABSTRACT

The digital gap in online higher education is posing a serious obstacle to a fair learning opportunity, especially in undeveloped areas. We examine this issue in the context of Gilgit Baltistan a geo-politically isolated and ethnically diverse part of Pakistan – where participation in online education is influenced by, among other things, gender. Specifically, this study looks into the gendered dimension of digital access and its impact on women participation in online higher education. The main purpose of this research is to investigate the challenges female students from Gilgit-Baltistan face in accessing higher education online and how these hinder their academic achievement. Using a mixed-method study design that included 2,000 respondents through quantitative surveys and qualitative interviews, this research maps significant factors including Internet access, social norms and infrastructure barriers. The results show that women face heavier barriers throughout both the digital building and serving of their needs. The paper ends with policy suggestions to close the gender digital divides, including improving digital infrastructure, pushing for a gender inclusive policy environment and stimulating community participation. This study supports the analysis of gender-specific disparities in access to digital technologies and advocates for interventions to mitigate these challenges in GB.

Keywords: Digital divide, online education, gender access, Gilgit-Baltistan, socio-cultural norms, educational barriers, mixed-methods.

INTRODUCTION

The phenomenal growth of online education during the last two decades has revolutionized higher education across the globe, particularly empowering students in

remote locations or those from underserved populations to have unprecedented access to quality education. The growing availability of Information and communication technologies (ICT) in education has unlocked new doors for students who were previously left out of formal education. These developments have been revolutionary with regard to how people in marginalized and remote communities use educational materials, enroll in degree courses and learn vital skills (Selwyn, 2016). But despite the promise of online education to democratize learning, the longstanding problem of the digital divide has stood in the way — nowhere more so than in developing places like Gilgit-Baltistan.

Digital divide is generally defined as the gap between people with effective access to modern information and communication technology (ICT) tools, such as the internet, computers or mobile phones, and those without. And this gap is about much more than technology but relates to socio-economic, geographic and cultural factors that can influence not just the reach, but the impact of these technologies as well. In areas such as Gilgit-Baltistan, where extended geographical terrains coupled with scarce resources and socio-cultural barriers further exacerbate the existing problems, digital technology access is severely constrained (Van Dijk 2020). Though internet connectivity and access to digital resources has generally increased over the years in Pakistan, there are still remote parts of the country – such as Gilgit-Baltistan in its northernmost region – that remain cut off from reliable internet services and new age technologies. Pakistan Telecommunication Authority (2020) report that internet penetration in Gilgit-Baltistan is significantly less than other parts of the country thus hindering the students in this geographic area to connect to e-learning.

Socio-cultural barriers, apart from infrastructural ones, serve to widen the ‘Digital Divide’. In numerous areas of Gilgit-Baltistan, women face additional restrictions on their ability to move around freely and travel alone or with non-mahram (men not related by family) due in part to gender roles and societal expectations. The literature has revealed that a gendered digital divide exists in many developing countries where

cultural and societal practices regard domestic duties as being more important than education, particularly for women (Chhachhi, 2018; Mazzarella & Peden, 2020). This is especially the case in rural areas where girls are more likely to be under pressure from society to play a role within their families and less able to engage with digital learning. In addition, the digital illiteracy among such women and girls in these countries, combined with absence of education provisions and the digital divide considerably affects their ability to access online educational materials (Cunningham & Morris, 2014).

The convergence of restricted digital infrastructure, socio-cultural constraints and gendered access constitutes a complicated predicament for women in Gilgit-Baltistan. Boys in the region's cities, meanwhile, usually have better access to digital tools and online education, since they are more likely to hail from homes with better infrastructure and face fewer social mores. However, female learners in rural communities encounter substantial barriers to digital connectivity, gendered social expectations and educational aspirations. These barriers, in their gender specific aspect, do not only include limited access to technology but embrace wider issues related to social justice, education and empowerment. Consequently, women in these regions are especially disadvantaged when it comes to opportunities and achievements in online higher education.

This study also addresses these gendered barriers by investigating how female students in Gilgit- Baltistan access online higher education. Our objective is to explore through the gender lens and in relation to online education, the issues and conditions that underpin this aspect of gendered digital divide. Awareness of these challenges is essential for the creation of targeted interventions that bridge the gender gap so women in Gilgit-Baltistan have equitable access to educational opportunities offered through online platforms.

Although research on digital divide has been voluminous in the world focusing on socio-economic and geo-divides of access to ICT, (Warschauer, 2003), there is a large

empirical lacuna that operates within developing contexts that specifically highlights gendered dimensions of this divide (and particularly vis-à-vis higher education). While the discourse on digital divide has generally neglected Gilgit-Baltistan (and gendered aspect of this phenomena), it remains predominantly focused on Pakistani context. Studies of digital access in Pakistan tend to take a national level of analysis without discussing the unique obstacles women in rural and isolated spaces such as Gilgit-Baltistan face, Khan & Sadiq (2021). This gap in the literature illustrates the demand for research that specifically explores how women in Gilgit-Baltistan engage with online education platforms, what barriers in using these tools exist and how such barriers influence their learning outcomes.

To this end, the study seeks to address this gap in the literature by examining the gendered digital divide regarding online HEIs of Gilgit-Baltistan. Through examining the particular obstacles to female students in this area, the research aims to make a significant contribution to the broader debate on digital divide and gender parity in education. It will also provide some policy, academia and civil society specific action-oriented recommendations in order to break barriers that hinder women's participation in online higher education in Gilgit-Baltistan.

Research Objectives & Hypotheses

To explore the digital divide in online higher education in Gilgit-Baltistan with a particular reference to gendered accessibility.

To determine the social and technology structures that are responsible for causing the gender digital divide.

To examine academic experiences of women who are constrained by digital access.

We suggest that gender as well as social and cultural factors deeply influences access to distant form of online

LITERATURE REVIEW

Scholars have conducted ample research on the digital divide, and particularly its effects upon education Research highlights how unbalanced access to information

communication technologies (ICTs) affects educational outcomes. The digital divide is the gulf that exists between people who have access to modern information and communication technology and those who do not. Warschauer (2003) contended that by using digital technology, education can be seen as more democratic for learning possibilities where none would otherwise exist, such as in isolated or disadvantaged communities. But the disparate access to these technologies leads to unequal educational opportunities, especially for underserved communities.

Van Dijk (2020) also expanded on ICT access, it isn't simply a matter of possession] of the devices but also entails skills, knowledge and opportunities to use them productively. This divide has serious implications for education. Students with access to ICT are generally more likely to achieve at higher levels than peers who do not have that access, because digital technologies enable students to interact and experiment with a broad array of educational content, tools and resources while collaborating with multiple authors within communities of practice and apply their skills across the curriculum in authentic settings (Warschauer, 2003). A divide that is perpetuating inequality, also restricting educational opportunities to those less fortunate.

The digital divide is especially evident in rural localities of developing countries where there is lack of infrastructure and the people have limited access to technology. This digital divide has an impact that is especially detrimental to women who due to socioeconomic and cultural reasons have usually a pronounced lack of access to digital technologies. In Pakistan, women in rural areas encounter myriad barriers such as low ICT literacy, mobility constraints (imposed by norms and customs), and financial constraints when it comes to utilizing the ICT facilities available to them (e.g. Khan & Sadiq, 2021). This is in line with global trends, given the lower rates of women's device ownership and usage – particularly in rural and less economically developed regions. These inequalities restrict access of women to online educational materials and impede their academic career progression.

In scholarly literature, it has been widely demonstrated the gender gap in access and use of technology. Research studies by Diga (2016) and Chhachhi (2018) illustrate the additional obstacles women in various parts of the world face to access digital technologies. Such barriers are frequently tied to socio-cultural norms that impact the roles of women in society. In several countries such as Pakistan, due to the social system women in households are assigned with more household duties than education and professional career development, which is a restriction for them towards technology. This binary division of labor is a primary cause of the digital divide as it limits women's chances to acquire the skills and knowledge required to utilize digital tools effectively (Chhachhi, 2018).

Another major challenge is the lack of digital literacy, especially among women. Women in various communities are also denied formal education out of technology-related fields, which makes them less able to navigate the digital platforms (Diga, 2016). The gender divide in digital literacy is particularly acute in rural communities, where resources for educating women are limited. This digital illiteracy only exacerbates the digital divide, as women are unable access to online education (essential requirement in modern learning) many times.

Financial constraints are also prominent in the gendered digital divide. In lots of homes, it's men who can afford to buy digital devices and pay for the internet. Women, however, are more likely to have lower paying jobs and miss out on economic opportunities meaning they lack the ability to invest in technology for their online learning. The economic gender gap reinforces the digital divide particularly in Pakistan where economic participation of women is less than men (Khan & Sadiq, 2021).

Beyond these challenges, cultural barriers also limit women's access to digital technologies. In many parts of Pakistan, women's movement is curtailed in conservative societies, making them less likely to be able to take advantage of online learning opportunities. Societal factors play a role in whether or not women are

discouraged and physically prevented from using the digital world, since society worries that technology will be used improperly. These social norms deepen the gender digital divide by reducing women's scope to access ICT education.

Gilgit-Baltistan, in Pakistan's extreme North, is an exceptional region to assess the digital divide. It consists of most mountainous terrains, rural communities and limited infrastructure facilities, with Kadior being one of the least developed areas in the country. Internet penetration in Gilgit-Baltistan is below the national average, and there are peculiar challenges for both connectivity and accessibility (Pakistan Telecommunication Authority 2020). Because of the region's geographic isolation, it has been difficult to build the infrastructure for extensive internet access, which has huge implications for education in that area.

In GB, women still have multiple hurdles to get online education in form of technological and cultural barriers. In rural areas, female students are especially disadvantaged by these stumbling blocks, which include diminished access to digital devices and spotty internet service. Mirza (2021) suggested for the students of Gilgit-Baltistan it is expected that girls would be excluded from online learning because of resources constraints and cultural values where on domestic work by women is prioritised instead of education. This gendered gap in digital learning creates another reason for educational disparity in the region.

Additionally, digital illiteracy of females in Gilgit-Baltistan acts as a major barrier to the virtual education. There are very few digital literacy programmes in the region and women do not have the necessary skills to use digital platforms. Without these skills, the women students of Gilgit-Baltistan are unable to access the online educational facilities which are now considered an integral part of higher education.

Although the global and regional review of literature related to digital divide is ample, but there appears a significant gap in studies dedicated solely to examine gendered-based digital divide in online higher education within the context such as GB. Most of the literature that exists regarding digital divide in Pakistan considers actors or

provides facts in relation to broader issues of connectivity and access but fails to analyze challenges faced by women in rural (backward areas) like Gilgit-Baltistan. Most studies about digital divide have either sited on national access or urban -rural differences with limited examination about disparity in gender specific to online education in the remote areas (Khan & Sadiq, 2021).

This study attempts to respond to this need by undertaking a more holistic examination of the barriers women encounter in accessing online education in GB, as well as how these barriers affect their learning experiences. Through investigating the gendered digital divide in this localized context, this research will bring further insight into intersectionality between digital access and gender within education. Summary of findings This study, in addition to contributing to theory, will offer pragmatic implications on how directed interventions could be a vehicle towards bridging the digital divide and advancing greater gender parity within online higher education.

METHODOLOGY

This engagement with mixed-methods research is essential to paint an overall picture of the gendered digital divide in online higher education in Gilgit-Baltistan through both quantitative and qualitative data. Use of both methodologies ensures that the issue can be examined in a more comprehensive manner and offers an opportunity to complement broad statistical analysis with deep personal anecdotes. Mixed-methods research allows for a more comprehensive understanding by combining the use of qualitative and quantitative information (Creswell, 2014). The quantitative part of the research includes a series of structured questionnaires that seek to provide some measurable evidence about students' access to digital resources, internet connection, digital literacy level and academic performance. This qualitative part is complemented by semi-structured interviews with female students to better understand their unique experiences and perceptions about e-learning, but also the barriers they encounter - particularly the gender-specific ones.

Use of structured questionnaires increases the possibility of obtaining data from a large number of respondents (approximately 2000 students) with varying HEIs in Gilgit Baltistan. This higher sample size is critical to ensure that the findings are statistically significant and representative of the digital divide in the area. In contrast, qualitative interviews with 40 female students provide thick contextual understandings of how digital access—or its absence—impacts their education and how expectations about conduct shape their experiences engaging with online learning platforms (Fetters, Curry & Creswell, 2013).

The sampling method used in this study is intended to obtain a wide variety of student experiences and issues across Gilgit-Baltistan. The online surveys are used to gather the quantitative data from students studying at HE institutions in the region. These surveys collect information on a number of factors including internet access (e.g., presence, speed and reliability of) digital literacy (e.g., understanding how to use online learning websites and digital tools), academic achievement (i.e. grade point average \((GPA)\)) and gendered challenges (e.g., social expectations, family obligations, access to resources). These are important issues in relation to the digital divide and the impact on student learning, particularly for females.

Semi-structured interviews with 40 female students who have faced obstacles to participating in online education are carried out for the qualitative part. The interviews will address questions about how socio-cultural norms affect their access to digital technologies, the immediate and broader challenges they confront in education spaces, and what perspectives these young women have on how gender shapes their pathways into online learning. When semi-structured interviews are employed, the interviewer is able to deviate, if necessary, from the interview schedule in order to probe responses or to engage with other issues in greater depth which may be raised by who are being interviewed.

Both quantitative and thematic analysis methods will be employed. Quantitative data will be analyzed using the appropriate statistical tests, frequency distribution tables

and cross-tabulations for Frequencies; while SPSS will also be used to test regression and inferential statistics. These will make it possible to see patterns and relationships in the data, such as disparities in digital access between boys and girls, or associations between digital literacy and school results (Field, 2013).

In relation to qualitative data, NVivo software will be used to aid the coding and thematic analysis of interview transcripts. NVivo made it easy to store and organize the rich, detailed qualitative data and analysis by identifying recurrent themes for example - the particular barriers women face when accessing online education. A thematic analysis based on Braun and Clarke (2006) will be applied to analyses patterns in the data systematically, yielding a “thicker” understanding of female students’ experiences.

Ethical considerations The study adhere to ethical principles of social science research striving for emancipation and protecting participation rights and the research process. All participants will provide informed consent and are fully aware of the objective, their involvement and right to confidentiality and anonymity. No personal data or interview transcripts will be held unsecurely and all details collected for the research only. Participants will also be informed that they may refuse to participate in the research or drop out of the study without facing any adverse consequences.

Careful study design and consistently applied data collection procedures assure the reliability, and validity of the investigations. A mixed methods design can triangulate, improving the validity of findings by comparing data from diverse sources (Denzin 2012). The surveys, which are structured in nature and therefore can be compared across the three levels of analysis, provide quantitatively oriented data generally not reachable through semi-structured interviews that offer depth and context to the gendered digital divide. Additionally, the sampling frame of the study has incorporated such a variety of students from across different institutes in Gilgit-Baltistan that its results can be generalized for the wider student population in Gilgit-Baltistan.

RESULTS AND EVALUATION

The findings of the survey also indicate a significant gender gap in internet access among male and female students in Gilgit-Baltistan, highlighting that not only is there a digital divide based on geographic location but there is also one based on gender. Reliable internet access was only accessible to 40% of females than (65%) males. This wide disparity can be accounted for due to some reasons including the isolation of the rural areas that many women students belong and extended socio-cultural factors where education, particularly mobility of men is emphasized. Poor internet structure in rural Pakistan, even in Gilgit-Baltistan, leads to women (especially those living in rural areas) bearing the brunt of it (Khan and Sadiq 2021).

Female students also had a markedly lower digital literacy; 55 percent reporting poor digital skills compared to 35 percent among males. Such a gap is symptomatic of wider global imbalances in terms of women's lower levels of digital literacy compared with men, especially in developing countries (Chhachhi, 2018). This is accentuated by the limited exposure to formal training on digital technologies, lack of access to digital tools in schools and lower focus on skill development with respect to use of Digital technologies for women. As Warschauer (2003) stated, the facility of using ICT as a condition for interacting in online education and learning to succeed in an era dominated by digital media and technology makes such gaps in digital literacy a major impediment to women in GB.

Qualitative interviews conducted with 40 female students revealed the socio-cultural and infrastructure barriers that exacerbate the gendered digital divide. The societal pressure many of the SNS respondents felt was to be more concerned about housework, for example vacuuming and mowing the lawn, or caring for animals or children rather than school. This pressure restricted the time and focus they were able to commit to online learning, with women being burdened by following traditional gender roles at home. This is consistent with Diga (2016) who noted that socio-

cultural practices of different nations of the world, with specific reference to South Asia discourage women from accessing education out right especially via ICTs.

Beyond these social constraints, participant experiences of unreliable internet connectivity that inhibited them from participating in online classes and completing assignments added to their frustration. A lot of female students in the rural areas said that they had frequent internet disruptions, slow connectivity and limited access to required hardware, which added to their woes for accessing on-line education. These technological obstacles, combined with an absence of digital skills made female and male students achieve at significantly different levels academically. The socio-technical constraints mentioned here result in educational inequity (Mazzarella & Peden, 2020) because students with unreliable access to digital resources are not able to take advantage of the online learning opportunities for all that they offer.

In conclusion, results from quantitative and qualitative data point to the intersectionality of the digital divide in Gilgit-Baltistan where gender, geo-location, and sociocultural influences mutually impede women's access to online higher education. With the optimum use of digital tools, boys are actually better positioned than girls under these conditions and there is every indication that learning loss due to lockdown will be higher among girls. These include not only the tangible barriers posed by internet access, but also long-standing social expectations ie that curtail women's autonomy and participation in education.

These results also emphasize the importance of managing gender issues with regard to digital divide. As Van Dijk's (2020) work highlight, the digital divide is about infrastructure but also involves socio-cultural dimensions that influence how different groups engage with new technologies. From within Gilgit-Baltistan, women face pushbacks from two sides: they are prevented from accessing the internet by geographic and infrastructural constraints; in addition, their gendered social roles as caretakers lead to further responsibilities that render them unable to use digital learning platforms.

Evidence of the combined disadvantage faced by female learners in this region suggests a required targeted intervention for technological and socio-cultural obstacles. According to Mirza (2021), investment in internet infrastructure should be supplemented with gender equality interventions in education, including community-based initiatives, gender-focused digital literacy programmed and legislation aimed at addressing traditional gender norms. It is only through recognition of these multilayered problems that there can be more effective resolution 8, which would guarantee equal possibility for male and female learners in Gilgit-Baltistan to benefit from online higher education.

DISCUSSION

The findings of this study suggest that the digital divide in Gilgit-Baltistan is more than just a technical issue; it is underpinned by socio-cultural and gendered forces which hinder women's access to online learning. The wide gender digital divide among students, and moderate ICT-literacy level of female learners at the university, represents some aspects of systematic social exclusions posing on women access to online resources. Women are disproportionately impacted in rural areas under multiple forms of disadvantage which extend beyond the absence of technology infrastructure. The results are consistent with prior research (Chhachhi, 2018; Diga, 2016) that emphasize the essential role of societal gender norms in hindering women's ability to use digital technologies such as e-learning platforms. These obstacles aren't all cut from the same cloth: rural women face both infrastructural barriers, like lack of internet, along with social expectations that value their domestic responsibilities over their education. Consequently, female students may not be able to fully participate in online educational environments because of time limitations and the societal expectation to maintain traditional gender roles.

Moreover, the low literacy rate in digital for women of Gilgit-Baltistan region exacerbates these challenges. The digital ignorance is a major obstacle in following the online education and it mirroring with the worldwide tendency which indicated

that mainly women from underdeveloped areas will be having very least training and exposure to technology (Khan& Sadiq, 2021). In this sense, therefore, the digital divide is not about whether one has access to technology; it is also a question of knowledge and skill in knowing how to use that technology utilization. This supports the argument that the digital divide is an intersectional problem that does not only stem from technological differences, but also, social and cultural idioms of distress and gendered barriers to girls' education in the era of digitization.

The results of this study hold important policy implications, notably in relation to the gender aspect of the digital divide. Initiatives to increase digital access in Gilgit-Baltistan should extend beyond making technology more widely accessible. Socio-cultural barriers that hinder women's engagement in digital learning need to be considered. One of the main suggestions which stemmed from this study is that there should be targeted digital literacy projects for women. It is vital that such programs meet the specific needs and challenges of female learners in rural areas, covering basic digital skills, internet navigation and how to effectively use online learning platforms. Digital literacy initiatives should train women not simply in use of technology, but provide them the confidence to believe that they can compete in the digital world by removing obstacles for online education (Warschauer, 2003).

As well as digital literacy programmed, better internet infrastructure is essential. 4: Poor Internet Connectivity in GB The internet bandwidth is poor and not consistent for the rural areas of GB, which has been a major obstacle for students' interaction & learning process. Funding for broadband infrastructure and reliable internet access in rural areas would make certain women have the ability to connect to resources online. And also, addressing cultural and social obstructions which restrict women's autonomy and education. School-based awareness campaigns in Gilgit-Baltistan needs to focus on debunking patriarchal roles played by both men and women and the role of women's education simultaneity with the importance of men's education. Governments should also incentivize families to send women for online education by

providing them with financial or scholarship help, which would lower the domestic and economic burden on female students.

Despite offering valuable input on the gendered dimensions of the digital divide in Gilgit-Baltistan, this study has several limitations. The first limitation is its geographic focus. Although it does provide intricate insights into the situation in Gilgit-Baltistan, its data are valuable for other regions within Pakistan and South Asia to a lesser degree. Socio-cultural and infrastructural specifics of the area can differ significantly from respective conditions in rural and urban areas in South Asia. As a result, this study's findings are not the basis to generalize and apply to other specific locations in Pakistan and South Asia. Moreover, not capturing male students' views does not provide insight into how gender interacts between males and females in terms of the digital divide. Another limitation the reliance on survey and interviews implies potential biases related to the desire of social approval or the bias of recall. Additionally, no longitudinal studies on possible changes in digital access and literacy are provided. Future research can focus on the effect online education has on the long-term academic and professional performance of women. Future studies should also identify similarities and differences between the gendered dimensions of the digital divide in different parts of Pakistan and South Asia to ensure maximum effectiveness of the potential interventions.

CONCLUSION

This study also raises issues of gender as critical aspects of the digital divide in online higher education in Gilgit-Baltistan. The research indicates that women, especially those in rural areas, suffer from multiple barriers to access online education including infrastructure challenges, low digital literacy and sociocultural norms which threaten their independence. These insights align with the broader global literature on gendered digital divides, where rural and underdeveloped women tend to face

multiple disadvantages that can restrict their educational progress (Chhachhi, 2018; Diga, 2016).

This study adds to the nascent research on digital inequalities that some scholars are exploring specifically in South Asia, where socio-cultural norms have an impact on women's access to education, and hence information technology. It further underscores the intersectionality of digital deprivation and reveals that gender, geography, and culture intersect in dynamic ways women face greater challenges victimizing them from accessing and benefiting from online learning (Chung & Rhee, 2009; Van Dijk, 2020; Mazzarella & Peden, 2020).

This study offers tangible solutions to tackling these difficulties like specific digital literacy programs for women, enhanced internet infrastructure and policies that challenge gendered social norms. Such interventions are essential to creating an inclusive learning culture which offers equitable access to the online education irrespective of gender and geography. Bridging the digital divide is necessary for achieving social inclusion (Warschauer, 2003) and it is only by directly addressing both the technological and sociocultural limitations that real equity in education can be established.

In short, the study recommends a concerted multi-level strategy for addressing the digital divide in Gilgit-Baltistan, that focuses especially on gender and works to provide all students with equal access to online higher education opportunities including the possibilities of e-emancipation.

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