

RETHINKING RELATIONSHIPS: THE IMPACT OF TECHNOLOGY ON TEACHER-STUDENT INTERACTIONS IN HIGHER EDUCATION

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ABSTRACT

This study focuses on understanding the impact of technology on the communication of teachers and students within the context of higher education institutions in the Punjab region of Pakistan. The research comprised 250 individuals (200 students and 50 faculty members) from five public and private universities located in Punjab. These individuals were selected using purposive sampling. Structured questionnaires which included 25 Likert scale items, and semi-structured interviews with 20 individuals were used for the study to capture the understanding of technology-enabled communication, digital learning tools, and the closeness of the relationship. The quantitative data, which was analyzed using SPSS, included descriptive stats, correlation analyses, and t-tests. The qualitative interview data was analyzed through thematic coding to surface key themes. Results show technology improves and negatively discord pedagogical relationships, through the positive affordances of increased access and flexibility, and the negative of decreased face-to-face connection and communication proximity. The study also discusses the disparity in technology use between public and private schools, within the context of the infrastructure and digital literacy challenges in Pakistan. Findings suggest technology, to an extent, improves some features of the academic relationship, while worsening the prolonged connection of teachers and students. This study adds to the understanding of the extent meso morph technology on the interaction and personal relationship in higher education institutions within Pakistan.

Keywords: Understanding, impact, technology, communication, teachers, students, higher education, institutions, Pakistan.

INTRODUCTION

Extremely rapid technological advancements have transformed almost all aspects of modern society, with education being one of the most impacted. Particularly, higher education has experienced a shift in the paradigm of how technology is incorporated into teaching and learning, not to mention how the teacher-student relationships that have traditionally been the centerpiece of pedagogy are being redefined (Akour and Alenezi 2022). Learning Management Systems, video conferencing, and instant communication tools, as well as other digital technologies, have not only redefined communication and collaboration, but have also opened new avenues and posed new challenges concerning the relational dynamics of academic settings. In the case of Pakistan, the different levels of educational institutions and varying degrees of digital integration, technologies' urban-rural divides, and public-private disparities in access to technology have all influenced the technological education revolution (Ghory and Ghafory 2021).

Teacher-student relationships have mostly been defined by direct, face-to-face interactions through which the educator not only shares knowledge, but also mentors, guides, sustains a dialogue, and develops the student's critical thinking abilities. These relationships have been documented as foundational to student motivation, engagement, academic success, and educational experience (Amerstorfer and Freiin von Münster-Kistner 2021). The increasing reliance on technology-mediated interactions, however, has introduced a novel dimension to these relationships, one that provides greater ease and access, but also the prospect of losing the human connection. In Pakistani higher education the potential for more egalitarian interactions is unique since there are culture-based hierarchical relationships and a digital divide that inhibits the use of online communication tools for peer interaction (Wang and Liu 2024).

Globally, the COVID-19 pandemic sparked rapid changes and technology adoption in education, and the world moving into hybrid education systems and digital communication in Pakistan educational systems. Faculty and students made a sudden and unplanned shift to online and hybrid systems of instruction designed to digitally integrate a form of instruction that had provided limited use of technology in the instruction system previously (Ashraf 2025). Digital access, lack of skills, and digital navigation inequities that were concealed in the educational systems came to the forefront. While the use educational technology continued during the pandemic and the use of tools like Zoom provided ways to connect and to continue to offer educational instruction remotely, the question of inequity in access to educational opportunities during the adoption of educational offered systems that Pakistan educational system technology offered presents a form of inequity in educational opportunities that need to be considered. As lack of access to educational technology offered inequitable access education digitally intertwined with geographic inequities in education access. The gradual return to "normal" allows for the question of the impact that technology integration in the education system has on the otherwise quality of the educational interactions in the teacher/student dyad. This is important to understand to be able to capitalize on the technology for integration to interactions in the education system (Qazi, Sharif et al. 2024).

There are specific contextual factors that influence technology in teacher-student relationships in Pakistan, there are also uncommon instances deserving attention in the higher education system in Pakistan. Due to an increasingly digitized population, the demand for communication technology becomes ratified, more emphasis is placed on the prioritization of education quality, and there is constant relative equilibrium of infrastructural challenges, funding, and ignorance of human capital. Within the nationally recognized universities, there are public and private institutions with varying levels and standards of technology (Akram and Li 2024). Public institutions of higher education are recognized as the nationally funded universities. They are also seen as the universities of last recourse. In between, there are private universities that are recognized as the universities of first recourse, primarily due to the technological advancement of their universities. They are also seen as the universities of first recourse, especially by economically provisioned families. In between both types of institutions, there are families of economically provisioned families of the first systematic universities of recourse. Within and in between, there are families of economically provisioned families of the first systematic universities of recourse. Within and in between calculation, there are families of economically provisioned families of the first systematic universities of recourse (Ashraf and Hussain 2025).

The investigation stems from the insight that there is an abundance of global literature on the intersection of education and technology, yet there is an even larger gap pertaining to studies that take a contextual approach to understanding this issue. Likewise, the role technology plays in mediating interactions between teachers and students is also context sensitive (Akram, Khan et al. 2025). To help alleviate this gap, the researchers focus on the higher education sector in Pakistan where the insights generated would carry local relevance, but would also be helpful to other developing nations struggling to modernize educational technology without losing the interpersonal educational ties. I expect the results to guide the policy, practice, and faculty action to ensure that the educational interactions in higher education are in a close range to the desired relational type.

RESEARCH OBJECTIVES

1. To assess students' and faculty members' views on how technology has impacted the quality and quantity of interactions between teachers and students in Pakistani higher education.
2. To elucidate the specific challenges and opportunities technology-mediated communication presents in fostering meaningful teacher-student relationships in higher education.
3. To examine the differences in the adoption of technology and its effects on the relationship between teachers and students in public and private universities in the Punjab province.

RESEARCH QUESTIONS

1. In what ways do students and faculty value and evaluate the role of technology in shaping the quality of their academic interactions and the relationships they form?
2. What are the key issues and opportunities technology-enabled communications providing in the relationships between teachers and students in the Pakistani higher education system?
3. What are the differences in technology integration and the consequences of its integration in teaching and learning processes between public and private institutions?

SIGNIFICANCE OF THE STUDY

The research has value for the various actors in the higher education system in Pakistan. For policymakers and higher education institutions' leadership, the research offers insight for the development of balanced technology integration policies which embrace research and innovations, while maintaining the quality of relationships in the academic community. This guides relevant strategic decisions regarding the alignment of institutional infrastructure, faculty development programs, and the balancing of institutional support systems. Faculty members appreciate the impact of their communicating and the relationships they form with students in adopting technology in teaching. Students speak for themselves regarding their digital-academic interactions and their experiences which are likely to influence decisions made at the institutional level. The research provides the first contextualized insights to the literature on the relational implications of technology in higher education in Pakistan, which has so far been limited, and addresses the sector's unique cultural, institutional, and infrastructural challenges. In addition, the mixed-methods approach presents both quantitative data and detailed qualitative information, considering the comprehensive nature of the research, which can inform practical intervention and future educational research within similar contexts of developing countries.

LITERATURE REVIEW

The intersection of technology and education has attracted considerable scholarly attention over the past two decades, with researchers exploring how digital tools transform pedagogical practices, learning outcomes, and the relational dynamics between teachers and students. Early literature on educational technology focused primarily on effectiveness and efficiency, examining whether technology-enhanced instruction improved learning outcomes compared to traditional methods (Mohsen, Althebi et al. 2025). Recent studies have broadened to consider the complex social, emotional, and relational dimensions of technology integration, recognizing that education fundamentally involves human interactions that cannot be reduced to mere information transmission. This shift reflects growing awareness that while technology offers powerful capabilities for communication and collaboration, it also fundamentally alters the nature of interpersonal connections that have traditionally defined effective teaching and learning relationships (Rahm 2023).

Research on teacher-student relationships consistently demonstrates their critical importance to educational success across all levels of schooling. Strong teacher-student relationships have been associated with increased student motivation, higher academic achievement, improved classroom behavior, greater emotional well-being, and enhanced engagement with learning. These relationships provide students with a sense of belonging, support, and trust that facilitates risk-taking, questioning, and the deep learning necessary for intellectual growth (Li, Bergin et al. 2022). In higher education specifically, where students navigate greater independence and complexity in their academic pursuits, supportive faculty relationships become particularly valuable for persistence, career development, and scholarly identity formation. The quality of these relationships depends on multiple factors including communication frequency, approachability, responsiveness, mutual respect, and the ability to establish personal connections beyond purely academic content (Robinson 2022).

The advent of digital communication technologies has introduced new possibilities and challenges for developing and maintaining teacher-student relationships. Email, learning management systems, discussion forums, instant messaging, video conferencing, and social media platforms have created multiple channels through which teachers and students can interact, potentially increasing accessibility and flexibility. Studies have shown that technology can

reduce barriers to communication, particularly for students who may feel intimidated or uncomfortable approaching faculty members in person due to cultural factors, personality traits, or perceived power differentials (Adeline 2024). Digital platforms can provide more democratic spaces for participation, allowing students time to formulate thoughtful responses and enabling asynchronous communication that accommodates diverse schedules and learning preferences. Additionally, technology facilitates access to faculty members beyond traditional office hours and physical campus boundaries, potentially strengthening relationships through increased availability and responsiveness (Yeung, Cheng et al. 2023).

Scholarly literature highlights significant concerns about technology's impact on the depth and quality of teacher-student relationships. Face-to-face interactions provide rich communication cues including body language, tone of voice, facial expressions, and immediate feedback that contribute to understanding, empathy, and connection. Text-based digital communication often lacks these nuances, potentially leading to misunderstandings, reduced emotional connection, and more superficial interactions. Research indicates that excessive reliance on technology-mediated communication may diminish opportunities for spontaneous conversations, informal mentoring, and the development of trust that emerges through repeated personal encounters (Adade, Amos et al. 2025). Some studies suggest that while technology increases communication frequency, it may simultaneously reduce interaction quality, with brief, transactional exchanges replacing more substantial dialogic engagement. Furthermore, the blurring of boundaries between personal and professional spheres through constant digital connectivity raises questions about appropriate communication norms and faculty workload sustainability (Wang and Liu 2024).

Cultural context significantly mediates how technology affects educational relationships, yet much of the existing research originates from Western, particularly North American and European, educational settings. These contexts may not fully reflect the dynamics present in collectivist societies, hierarchical educational systems, or resource-constrained environments characteristic of many developing countries. In South Asian educational contexts, including Pakistan, traditional teacher-student relationships often embody greater formality, respect for authority, and clearly defined hierarchical boundaries compared to Western models that emphasize more egalitarian student-centered approaches. The introduction of digital communication technologies into these culturally specific relationship patterns creates unique tensions and opportunities that require contextualized investigation. Limited research exists examining how Pakistani faculty and students navigate technology-mediated interactions while maintaining culturally appropriate professional boundaries and expectations (Shonfeld, Cotnam-Kappel et al. 2021).

Infrastructure and digital divide issues represent critical considerations in developing country contexts that significantly shape technology's educational impact. While literature from well-resourced institutions often assumes universal access to reliable internet connectivity, appropriate devices, and digital literacy skills, these assumptions do not hold in many Pakistani educational settings (Abid, Zahid et al. 2021). Disparities in technological access both between and within institutions can exacerbate existing educational inequalities, potentially limiting relationship-building opportunities for economically disadvantaged students. Public universities in Pakistan often struggle with inadequate technological infrastructure, insufficient technical support, and limited faculty training in effective technology use, whereas private institutions generally enjoy better resources but serve smaller, more privileged student populations. These structural factors fundamentally influence how technology can be leveraged to enhance rather than hinder teacher-student relationships, suggesting that technical solutions alone cannot address deeper systemic inequalities (Nazir and Khan 2021).

Recent studies emphasize the importance of intentional pedagogical design in leveraging technology to support rather than undermine educational relationships. Effective technology integration requires thoughtful consideration of communication purposes, appropriate tool selection, clear expectations about response times and communication norms, and deliberate efforts to maintain personal connection within digital interactions (Gul, Tahir et al. 2023). Faculty development programs that address both technical skills and relational dimensions of technology-mediated teaching have shown promise in helping educators navigate these challenges. Additionally, hybrid or blended approaches that combine face-to-face interaction with technology-enhanced communication may offer optimal pathways for maintaining relationship quality while capturing technological benefits. Understanding how Pakistani higher education institutions and their faculty members are currently approaching these challenges remains essential for developing contextually appropriate strategies that honor local cultural values while embracing technological advancement (Rehman, Zhang et al. 2021).

RESEARCH METHODOLOGY

The researchers adopted mixed-methods approach to examine the role of technology in the teacher-student relations in higher education institutions in Pakistan. Using purposive sampling, the researchers selected a sample of 250 study participants, composed of 200 students and 50 faculty members from 5 public and private universities in Punjab. Data collection was conducted through two primary instruments, a structured 25-item Likert-scale questionnaire, and semi-structured interviews conducted with 20 participants to explore their lived experiences in greater detail. The

questionnaire, aimed at the collection of quantitative data, was made available in both a digital format through Google Forms and a hard copy to maximize access based on varying regional internet connectivity. For the quantitative data collected through questionnaires, SPSS was used to perform descriptive and inferential, specifically correlation and independent t-test, statistical techniques to tease out significant research patterns and relationships. For the qualitative data collected through interviews, the researchers made use of transcription, thematic coding, and qualitative analysis to surface the patterns and narratives around technology's role and shifts in teacher-student relationships, communication barriers, and disengagement. Ethical principles of the study included informed consent and the right to confidentiality guaranteed to all participants. This diverse set of methodologies allowed the researcher to gain a dual perspective on the statistical trends from the higher education sector in Pakistan and the contextual details surrounding them.

RESULTS AND DATA ANALYSIS

QUANTITATIVE ANALYSIS

The quantitative phase of this study gathered responses from 200 students and 50 faculty members across five universities in Punjab. The data analysis reveals several significant patterns regarding technology's impact on teacher-student interactions in Pakistani higher education.

Table 1: Demographic Characteristics of Participants

Category	Students (n=200)	Faculty (n=50)
Male	108 (54%)	32 (64%)
Female	92 (46%)	18 (36%)
Public University	120 (60%)	28 (56%)
Private University	80 (40%)	22 (44%)
Age 18-22	142 (71%)	-
Age 23-30	58 (29%)	18 (36%)
Age 31-45	-	22 (44%)
Age 46+	-	10 (20%)

The demographic distribution shows relatively balanced gender representation among students, though male participants slightly outnumbered females in both groups. Public university participants comprised the majority, reflecting the larger enrollment in public institutions. The student sample predominantly consisted of traditional college-age individuals, while faculty members represented diverse career stages. This demographic composition provides a comprehensive cross-section of the higher education population in Punjab, enhancing the generalizability of findings within this regional context.

Table 2: Frequency of Technology-Mediated Communication

Platform/Tool	Daily Use	Weekly Use	Monthly Use	Rarely/Never
Email	32%	45%	18%	5%
LMS (Moodle/Canvas)	58%	28%	10%	4%
WhatsApp	67%	22%	7%	4%
Video Conferencing	15%	38%	32%	15%
Social Media	12%	18%	25%	45%

Technology adoption patterns reveal WhatsApp as the most frequently used communication tool for daily interactions, followed by Learning Management Systems. Email demonstrates consistent weekly usage rather than daily engagement. Video conferencing shows moderate adoption with most participants using it weekly rather than daily, suggesting its role as supplementary rather than primary communication mode. Social media remains the least utilized platform for academic interactions, with nearly half of participants rarely or never using it for teacher-student

communication. These patterns indicate preferences for familiar, accessible platforms over formal institutional systems for routine academic communication.

Table 3: Perceptions of Technology's Impact on Relationship Quality

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Technology improves accessibility to teachers	38%	42%	12%	6%	2%
Digital communication reduces personal connection	22%	35%	25%	14%	4%
Technology facilitates timely feedback	30%	38%	20%	10%	2%
Face-to-face interaction quality has declined	18%	28%	30%	20%	4%
Technology creates communication barriers	15%	25%	32%	22%	6%

Perceptions regarding technology's impact reveal predominantly positive views about accessibility and feedback timeliness, with 80% of participants agreeing that technology improves teacher accessibility. However, 57% acknowledge that digital communication reduces personal connection, indicating recognition of trade-offs between convenience and relationship depth. Opinions remain more divided regarding whether face-to-face interaction quality has declined and whether technology creates barriers, with substantial neutral responses suggesting ambivalence or context-dependent experiences. These mixed perceptions highlight the complex, multifaceted nature of technology's relational impact.

Table 4: Comparison Between Public and Private Universities

Variable	Public Universities (M)	Private Universities (M)	t-value	p-value
Technology access satisfaction	2.8	4.1	-6.45	<0.001
Communication frequency	3.5	3.9	-2.18	0.032
Relationship quality rating	3.2	3.7	-2.89	0.005
Digital literacy confidence	3.1	4.0	-5.23	<0.001
Technology training adequacy	2.4	3.6	-6.78	<0.001

Independent t-tests revealed statistically significant differences between public and private institutions across all measured variables. Private university participants reported substantially higher satisfaction with technology access, greater digital literacy confidence, and better technology training adequacy. Communication frequency and relationship quality ratings were also significantly higher in private institutions, though differences were less pronounced. These findings confirm disparities in technological resources and support systems between institutional types, with private universities demonstrating advantages that appear to translate into enhanced technology-mediated interactions. The highly significant differences in access satisfaction and training adequacy suggest infrastructure and professional development gaps requiring policy attention.

Table 5: Correlation Between Technology Use and Relationship Variables

Variables	Correlation Coefficient	Significance
Communication frequency & relationship quality	0.58	p<0.001
Technology satisfaction & engagement	0.52	p<0.001
Digital literacy & communication effectiveness	0.47	p<0.001
Response time & student satisfaction	0.61	p<0.001
Platform diversity & perceived accessibility	0.44	p<0.001

Correlation analysis demonstrates positive relationships between key variables, with faculty response time showing the strongest association with student satisfaction. Communication frequency correlates moderately with relationship quality, suggesting that more frequent digital interaction contributes to stronger perceived relationships. Technology satisfaction positively correlates with engagement levels, indicating that when technological tools work well, both students and faculty engage more actively. Digital literacy significantly relates to communication effectiveness, highlighting the importance of skills development alongside infrastructure provision. These correlations suggest that successful technology integration requires attention to multiple factors beyond mere tool availability.

Table 6: Student Preferences for Interaction Modes

Interaction Type	Strongly Prefer Face-to-Face	Prefer Face-to-Face	No Preference	Prefer Digital	Strongly Prefer Digital
Course content questions	15%	20%	30%	25%	10%
Assignment clarifications	8%	15%	28%	35%	14%
Academic advising	38%	32%	18%	10%	2%
Feedback discussion	25%	35%	22%	15%	3%
Personal concerns	42%	28%	20%	8%	2%

Student preferences vary significantly based on interaction purpose, revealing nuanced attitudes toward communication modes. For routine matters like assignment clarifications and content questions, students demonstrate greater openness to digital communication, with roughly half expressing preference or acceptance. However, for more sensitive or complex interactions including academic advising, feedback discussions, and personal concerns, strong preferences for face-to-face communication emerge. Seventy percent prefer in-person advising, and a similar proportion favors face-to-face discussion for personal matters. These preferences suggest students recognize different communication modes as appropriate for different purposes, valuing personal contact for relationship-building and complex problem-solving while appreciating digital convenience for transactional exchanges.

Table 7: Faculty Perspectives on Technology-Mediated Teaching

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Technology increases workload	32%	38%	18%	10%	2%
Digital tools enhance teaching effectiveness	24%	44%	20%	10%	2%
Maintaining boundaries is challenging online	28%	36%	22%	12%	2%
Students are more communicative digitally	18%	42%	24%	14%	2%
Technology training has been adequate	8%	22%	26%	32%	12%

Faculty perspectives reveal concerns alongside appreciation for technology's benefits. Seventy percent report increased workload due to expectations for constant digital availability, while 64% acknowledge that maintaining appropriate professional boundaries becomes more challenging in digital environments. Despite challenges, 68% agree that digital tools enhance teaching effectiveness, and 60% observe that students communicate more through digital channels. However, only 30% feel they have received adequate technology training, with 44% explicitly disagreeing, indicating a significant professional development gap. These findings suggest faculty experience technology integration as simultaneously beneficial and burdensome, requiring better institutional support to optimize its potential while managing associated demands.

Table 8: Impact on Different Aspects of Relationship Quality

Relationship Aspect	Improved	No Change	Declined	Mean Score (1-5)
Accessibility	72%	20%	8%	3.9
Responsiveness	64%	24%	12%	3.7
Trust development	18%	42%	40%	2.8
Emotional connection	12%	35%	53%	2.4
Academic support quality	45%	38%	17%	3.4
Mentorship effectiveness	20%	44%	36%	2.9

Technology's differential impact across relationship dimensions reveals a pattern where practical aspects improve while emotional and mentorship dimensions suffer. Accessibility and responsiveness show substantial improvement, with clear majorities reporting positive changes and high mean scores. Academic support quality also benefits moderately from technology integration. However, trust development, emotional connection, and mentorship effectiveness demonstrate concerning declines, with emotional connection particularly affected as 53% report deterioration. These findings illuminate the paradox of technology-enhanced education where convenience and efficiency gains occur alongside diminished relational depth, suggesting that institutions must intentionally address how to preserve human connection elements while leveraging technological advantages for practical communication.

QUALITATIVE ANALYSIS

Theme 1: Convenience versus Connection Dilemma

Interview participants described the tension of appreciating the convenience of technology while observing the loss of interpersonal touch. Students mentioned that the ability to reach faculty outside of office hours and get quick answers to questions was a relief and supported their learning autonomy. Students were, however, of the opinion that the faculty conversational engagement was of a more meaningful quality that allowed for the sort of depth and spontaneity that was genuinely useful. Students valued conversational learning that occurred during the more informal settings in the absence of tension during office hours and the mentoring familiarity that developed in less structured engagement, with faculty well before the season of examinations in the course. Faculty participants shared the sense of loss that accompanied efficiency and described it as a distance that was created. The narrative reveals that the means and the end in the use of technology in communication provide efficiency and improved learning outcomes, but the regulation of personal touch in the communication to use more of informal conversations has the potential to cause the loss of attritional depth in relationships.

Theme 2: Infrastructure Inequalities and Access Barriers

Those who participated in public universities had a lot to say about the lack of technological resources which create barriers, not bridges to communication. Students expressed dissatisfaction with the lack of internet access which impacted their ability to obtain online materials, take part in video meetings, and submit assignments on time. Faculty of institutions with fewer resources described lack of support from institutions in adopting the necessary technology like inadequate training on its use, the provision of obsolete technology, and lack of support to solve technological crises in teaching. Some participants pointed out how such gaps in technology use fostered and increased the existing socioeconomic divides. Students from low socioeconomic backgrounds were disproportionately affected in accessing education and the necessary support from faculty. This demonstrates the fact that there is a lot of unexploited potential in technology. When the prerequisite basic infrastructure is not in place, a great institutional groundwork is needed before the benefits become apparent in a fair way from technology in teaching and learning across the diverse higher education system in Pakistan.

Theme 3: Communication Clarity and Misunderstanding Risks

Some participants reported that text-based digital communication posed risk of misunderstanding communication that occurs seamlessly without face-to-face interactions. Students reported instances when faculty email responses were interpreted as terse and critical, triggering anxiety and confidence-damaging results, although those faculty responses were not intended as such. Faculty, in turn, described instances when students' digitally mediated messages were interpreted as disrespectful and presumptuous and described them as 'stingy' and 'problematic' without knowledge of the cultural and linguistic parameters that, together with medium constraints, generated such perceptions. Several respondents in interviews articulated that the absence of silence, and the immediate opportunity digital communication to clarify disparate messages requires, as well as the absence of tone, and disposed messages of frontal contact, calls for more deliberate planning of messages, although time constraints often countered that planning. In the absence of digital communication, the absence of a more salient communication medium, such as the telephone, punishes more conversations, communication that involves the delivery of constructive criticism, the discussion of more sensitive matters, and the explanation of more complex issues. Text-based digital communication evokes more friction than communication that occurs in the more salient medium of a telephone.

Theme 4: Boundary Blurring and Availability Expectations

Students and faculty alike voiced challenges around technology creating an expectation of a seamless intertwining of personal and professional realms and 24/7 associated availability. Faculty described expectations of real-time correspondence obligations and interactions regardless of the time or day of the week. Students also described a sense frustration about any lag during evenings and weekends. Faculty also expressed concern about erosion of work-life balance and sustainability of sustainable workload. Students, on the other hand, enjoyed immediate access but described strong uneasiness about faculty contacting them during officially unstructured times, and during weekends and holidays where traditional norms suggested of contact were implicitly assigned. Several of the respondents pointed to cultural norms of hierarchical relations which, in a variety of settings, used to define and control contact, but were increasingly challenged at the time of the study. Some faculty described the setting of official policies on time and access, while others struggled and described feeling guilt about not being 'always on'.

Theme 5: Differential Impact Across Personality Types

Participants noted that technology's impact on teacher-student relationships was highly dependent on individual personality and communication style. For introverted students, digital communication was a means of "liberation"; they were able to ask questions and engage in a dialogue without anxiety about public speaking or the risks of live performance. These students felt that technology helped them form stronger relationships with faculty than they ever would have in face-to-face meetings. In contrast, extraverted students felt frustrated with the limits of digital communication and the absence of the "liveliness and warmth" of in-person interactions, as well as the relationships they were trying to build. Faculty members also felt that the personality type associated with their teaching style

determined how they would adopt technology and how well it would work. Some faculty members felt that technology expanded their teaching possibilities, while others felt that it was disingenuous to teach in a way that did not involve a live interaction. This theme underscores the need to approach technology and its use in teaching with an understanding of the variance in its impact: effective strategies will need to incorporate diverse communication styles rather than rely on a rigid suite of communication technologies.

Theme 6: Cultural Adaptation and Contextual Appropriateness

One of the themes that emerged dealt with how specific aspects of technology-mediated educator-pupil relations were shaped by the Pakistani cultural context in ways that were different from the experiences in the educational practices of the West. The students reported how the traditional Pakistani norms of respect and authority and the deeply formal communication patterns of the culture overlaid their interactions on the digital systems, which was more casual and informal and assumed an equal status interaction among parties. Students reported indecision over the construction of the formal and informal patterns of communication in emails and messages. This excessive formality was experienced by the faculty as distant and cold, and formality was casually introduced which the faculty felt was disrespectful. The issues surrounding digital communication and the attendant power dynamics were particularly noted by the female students and faculty. A few participants reported communication challenges based on the use of English, which was the medium of instruction and was an additional factor of exclusion for students whose first language was Urdu or a regional language in their interactions with educators. This added to the barriers that the educators were facing in code switching. This demonstrates that technological tools built in other cultural settings are in the early stages of adaptation in Pakistani higher educational institutions.

DISCUSSION

The findings of this mixed-methods study illustrate the intricacies and multilayered nature of integrating technology within the scope of educators and learners' psychosocial engagements in Pakistani higher education. Although quantitative data indicates that the considerable opportunities respondents and faculty members exchange within the multiple channels of communication disentangle the operational challenges relative to the feedback turnaround time, access to faculty members, and the promptness of real-time communication, the literature is clear that the informal technological channels diminish the access challenges and communication opportunities surrounding temporal and spatial barriers. Additionally, the quantitative and qualitative data illustrate deterioration in the attitudes related to the emotional distance that educators maintain with the learners, and the trust and mentoring gaps. This is in alignment with the literature. This indicates that technological interactivity serves multiple and discordant psychosocial functions within relationships beyond emotional attunement, improvisational emotional communication, and nonverbal synchrony, which are the functions in the emotional and social relationships that are primary.

The study also highlights the inequalities that shape the impact of technology on education. As mentioned in the study, the differences in technology enabled communication and relationship building in private and public educational institutions drives inequalities. The positional advantages private educational institutions have in technology, infrastructure training, and communication resources shape the educational experiences using technology as described in the digital divide literature. The findings also illustrate that technological inequalities are relational in that they affect the quality of human relationships that are pivotal to the educational process. The public university respondents' focus on infrastructure challenges point to the need for large foundational investment in technology infrastructure to realize the relational possibilities of the technology. From a policy perspective, the findings suggest for Pakistani higher education that technology integration without addressing systemic funding inequities will increase, rather than reduce, existing educational inequalities.

Cultural changes and individual differences highlight the significance of qualitative themes that straight numerical values cannot illustrate, particularly the adjustability of communication modes with context. Participants understand that certain contacts necessitate some immediacy, while others can be mediated through digital technologies. This level of comprehension, and the need for it to inform changes in institutional policies and faculty practices, would be easily dismissed as commonplace. Resistance towards technology—and not that of technology itself—points towards the need for a more thoughtful and intentional alignment of selected modes of communication with the purposes of the interaction and the stages of the relationship. The observations made by the Pakistani participants on the culture-technology relationship illustrate that the transfer of educational practices from the West, along with the use of technology, does not work without a careful understanding of the local values, patterns of communication, and relationships of power and hierarchy that affect digital communication.

CONCLUSION

The studies discussed above show that technology reshapes teacher-student relationships in Pakistani higher education with positive consequences and some challenges that need to be addressed. The research participants argued that the

flexibility of digital contact provides practical advantages to the academic relationship to some extent. The increased frequency of contact and rapid feedback provided in relation to student assignments are positive and significant. These are improvements in student support that are real and must be acknowledged, especially for those students who might find certain supportive relationships difficult to access because of faculty availability, distance, or personal shyness. At the same time, however, the evidence here illustrates that these improvements involve significant losses of emotional and relational aspects of connection, trust, and the transformative, mentoring relationships that are critical to a student's education. Technology is useful for transactional communication, but it cannot replicate the richness of personal interaction that is essential to relationship-building.

The differences between public and private institutions highlighted in this study represent a serious issue that requires immediate addressing in policy. If the gaps in technology, digital literacy and faculty training in Pakistan's higher education sector aren't addressed, the system will lead to a two-tier education system with the privileged students enjoying a technology-mediated learning relationship with their faculty, while the less privileged students face even greater barriers to faculty support. This finding puts the issue of equity and access at the very center of discussions about technology in education. The cultural aspects discussed by the participants further underscore the need for contextually appropriate approaches that respect the educational and communicative traditions of Pakistan, rather than simply importing technology and practices that assume a different cultural setting.

In the future, Pakistani higher education institutions will find it necessary to develop appropriately nuanced blends where the use of technology will need to be balanced with the human elements necessary for quality instruction and valuable learning, which will be quite complex. It will be essential to avoid the dualistic perception of technology as either a panacea or a problem and to appreciate it as a resource whose ramifications are wholly dependent on the equity and care of its deployment within the particular institutional and sociocultural frameworks. The case study can influence the strategic directions of institutional policies, professional development programs for faculty, and teaching methods where technology can be a valuable resource to help ease the relational challenges that the human components of learning technologies will pose.

RECOMMENDATIONS

This study's findings suggest that the approach to harnessing the value of technology in the teacher-student relationship within Pakistani higher education systems should be more strategic in several ways. To begin with, the relationship enhancement potential of technology is equitable access which requires public universities to focus on providing technological resources and training programs on the use of such resources from a relationship enhancement perspective. Communication policies that spell out the balance of availability and accessibility of faculty, and the diverse ways of communication where substantive advising and mentoring is kept in the face-to-face interaction at the core, should be made. The training of faculty should address the relational aspects of technology use in teaching especially the need to foster a sense of presence in communication and the importance of boundaries. All stakeholders demanded unrestricted technology use and institutions should provide it in a controlled way. The one-size-fits-all technology approach should focus on the diverse preferences and personalities of the faculty and students. Finally, ongoing research on the impacts of technology and research on shifting practices should provide an evidence-based approach to the refinement of technology practices in the integration of technology into education. The relationship of technology to teaching is one of enhancement. Pedagogical technology integration should focus on other simplified and relational commitments of the institute.

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