

An Analysis of Digital Anxiety of Interaction Among Pakistani English Major Students

Dr. Asma Kashif Shahzad

asmashahzad@cuiveharhi.edu.pk

Associate Professor of English, Department of Humanities, COMSATS University Islamabad, Vehari Campus

Dr. Tahira Asgher

tahira.asgher@iub.edu.pk

Associate Professor, Department of English Linguistics, The Islamia University of Bahawalpur

Muhammad Rashid

s.mrashid5524@gmail.com

PhD English Linguistics Scholar at COMSATS, University Islamabad, Vehari Campus

Corresponding Author: Muhammad Rashid s.mrashid5524@gmail.com

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ABSTRACT

The fast transition to online learning after the COVID-19 pandemic has increased the burden of psychological barriers in the English as Foreign Language (EFL) learning, especially digital interaction anxiety, which is a state of stress, discomfort, and avoidance during online communication. This paper will investigate the frequency and correlations of four main constructs of digital interaction apprehension, including Social Communication Anxiety (SCA), Privacy Concern Anxiety (PCA), Interaction Anxiety (IA), and Student Evaluation Apprehension (SEA) in 68 English undergraduate majors students in Pakistani universities. Based on the Foreign Language Anxiety (FLA) theory (Horwitz et al., 1986) and Stress-Strain-Outcome (SSO) model, cross-sectional survey was carried out with 5-point Likert scale. The findings showed an average moderate score of overall levels of digital interaction anxiety (construct means of between 3.07 and 4.00). SCA became the most salient, and it has a significant positive correlation with SEA ($r = 0.663$, $p < .01$) and demonstrates that fear of social judgment increases the evaluation apprehension in online EFL classrooms. The observation that PCA and IA had a moderate negative correlation ($r = -0.302$, $p 0.05$) indicated that as privacy issues increase, avoidance principles, which include lurking and language practice restriction, also increase. Transitional adaptation issues mainly due to collectivist culture of Pakistan, face concern and continuous digital divide were emphasized by high ambivalence (up to 33.8% responses undecided). Such results project the FLA and SSO models to digital and culturally-specific settings and highlight the necessity of specific interventions, facilitating psychological safety, digital equity, and self-efficacy. The consequences to EFL pedagogy, teacher training and policy in the developing world are addressed.

Keywords: digital contact anxiety, foreign language anxiety, online EFL education, Pakistan English majors, assessment anxiety, post Covid education, cultural face anxiety

1. INTRODUCTION

Digital higher education, further encouraged by the COVID-19 pandemic, has radically changed the landscape of language learning all over the world. This change has presented new psychological issues to learners of the English language as a Foreign Language (EFL) especially English major students who depend on interactive practice to achieve communicative competence. One of them is the so-called digital interaction anxiety, which is expressed in stress, discomfort, avoidance, and self-consciousness in the process of virtual interaction, i.e., video calls, online conversations, group presentations, and synchronous

chats (Almaiah et al., 2022; Khan et al., 2022). In contrast to the conventional classroom anxiety, the anxiety associated with the digital interaction is also exerted by the technological limitations, diminished non-verbal communication, continuous recording of the interaction, and increased self-supervision using webcams (Huang et al., 2025; Joo and Damron, 2015).

English majors in Pakistan hold a particularly marginal position in the country where English is a gateway to higher education, jobs and the world, thus English major is a very vulnerable position in the country. Such students are supposed to be highly proficient in speaking, writing, and interactive discourse, but they commonly have to navigate in a collectivist cultural environment with the high level of face concern, which is the fear of losing social status due to making mistakes or becoming a target of negative evaluation (Hu et al., 2024; Capacio and Datugan, 2024). Pandemic necessitated the immediate shift to online platforms, which revealed and in many ways fuelled underlying problems of poor internet connectivity, the digital divide between cities and rural regions, high internet expenses, and low digital literacy (Adnan and Anwar, 2020; Abid et al., 2021; Sami, 2025). Research studies in-progress and post-pandemic actively feature high levels of anxiety, decreased engagement, and less active language use among Pakistani EFL students, most of which adopt passive lurking behaviors to evade judgment (Hanif et al., 2022; Khan, 2022; Rasool et al., 2023).

Another conceptual framework useful in explaining these issues is Foreign Language Anxiety (FLA), which was defined by Horwitz et al. (1986) as a scenario specific anxiety that entails communication anxiety, test anxiety, and fear of negative feedback. Although it has been thoroughly researched in the face-to-face environment, FLA needs to be applied to the digital sphere where asynchronous and synchronous communication impose specific stressors such as delayed feedback, the irreversible nature of the digital footprints, and privacy risks (Horwitz et al., 1986; Zheng et al., 2021; Abdel-Al Ibrahim, 2023). In line with this, the Stress-Strain-Outcome (SSO) model is a theory describing the process of how digital stressors (e.g., technical issues, social judgment anxiety) cause the development of psychological strain (anxiety) which ends up in adverse outcomes (e.g., avoidance, low self-efficacy, reduced participation, poor language proficiency, etc.; Hu et al., 2024; Gong et al., 2024).

Although the issue of online language learning anxiety is getting increased interest internationally, there is little research that is specific to the English major students in Pakistan. Most of the current literature combines EFL students in general or addresses the general issues of technostress and digital divide without breaking down specific constructs of digital interaction anxiety (Prasad et al., 2023; Fatima, 2024; Shams, 2024). English majors are unique learners and future practitioners (teachers, translators, communicators) who are especially under pressure since their collegiate and professional achievements hinge on virtual communication which is fluent and confident in both the international and professional spheres. In addition, the Pakistani society practices collectivism and face-saving, which increase the evaluation apprehension and subsequent avoidance, which continue to expand the gap between the necessary communicative ability and the actual performance (Hu et al., 2024; Baimakhan et al., 2024).

To eliminate this critical gap, the current research research problem empirically examines the phenomenon of digital interaction anxiety in Pakistani undergraduate English majors through four theoretically developed constructs: Social Communication Anxiety (SCA) which refers to the fear of awkward or negatively evaluated online social interaction; Privacy Concern Anxiety (PCA) which refers to the fear of exposing or misusing personal information over the Internet; Interaction Anxiety (IA) which refers to the fear of initiating or maintaining online social interaction; and Student Evaluation Apprehension (SEA) which refers The study employs cross-sectional survey research design on 68 respondents of public and private universities to test the prevalence of the survey question, the inter-construct relationships, and also the socio-cultural factor in the post-pandemic period.

1.1 Research Objectives

The research will: (1) identify the levels and trends of the four constructs of English majors in Pakistan concerning digital interaction anxiety; (2) identify correlations between the constructs and their consistency with cultural and technical variables; (3) discuss possible implications on communicative competence, engagement, and language proficiency in online EFL classrooms; (4) provide theoretically informed interventions that can help cultivate psychological safety and digital equity.

1.2 Significance of the Study

The study generalizes FLA and SSO models to the digitally mediated, contextualized EFL learning in a developing country setting. In practice, the research can guide teaching methods (e.g., low-stakes anonymous practice, AI-assisted rehearsal, privacy enhanced platforms), institutional policies (e.g., subsidized connectivity, digital literacy training), and national initiatives to facilitate inclusive online education. The study also helps in the purpose of equipping the English majors with anxiety-reducing digital communicative skills, thus helping to develop a generation of confident professionals in the global market, which is the objective of Pakistan in terms of equity in education and competitiveness in the digital era.

2. LITERATURE REVIEW

The adoption of online learning platforms has revolutionized the field of English as a Foreign Language (EFL) education, but it has also increased the number of psychological barriers, the most significant of which is digital interaction anxiety. This section is a synthesis of theoretical background and empirical data on the topic of digital interaction anxiety among EFL students, specifically the English major students in a collectivist developing setting, i.e. Pakistani. It blends traditional Foreign Language Anxiety (FLA) theory and modern technological expansions such as Stress-Strain-Outcome (SSO) model, and places special emphasis on the cultural, technological, and pedagogical aspects. The literature review notes that there are gaps that the current study combats.

2.1 Theoretical Foundations

2.1.1 Framework of Foreign Language Anxiety (FLA)

Horwitz et al. (1986) defined FLA as a situation-specific anxiety construct as a three-interrelated concept, including communication apprehension, test anxiety, and negative evaluation fear. FLA is based on self-beliefs of linguistic incompetence that displays as tension, fear, and avoidance that damage language functioning and desire to communicate (Horwitz et al., 1986; MacIntyre and Gardner, 1991). Speaking activities are the most anxiety provoking activities that occur in a traditional classroom since learners are subjected to instant public evaluation.

The shift to online space has relieved and increased FLA. Minimized non-verbal communication and the lurking feature can reduce immediate pressure, but technical failures, archival records, self-monitoring on a webcam, and delayed feedback will make self-examination more acute and anxiety about evaluation more pronounced (Russell, 2020; Huang and others, 2025; Zheng and others, 2021). Recent research proves that FLA continues to exist, and even increases in synchronous online environments, especially with all low-proficiency students that are afraid of the possibility of language mistakes being recorded for eternity (Khan, 2022; Shams, 2024; Schmidt-Fajlik, 2025).

2.1.2 Finer Digital Extensions of Communication Apprehension

Digital interaction anxiety does not limit itself to general FLA, but adds technology-specific stressors. The Social Presence Theory seems to believe that the perceived lack of actual interpersonal connection in virtual environments increases anxiety particularly when the learner has to simulate competence by using limited modalities (video, chat, or voice) (Short et al., 1976; Garrison et al., 2000). Technology Acceptance Model (TAM) also elaborates that anxiety undermines both the perceived ease of use and usefulness forming a process of feedback, which discourages the adoption and use (Davis, 1989; Boudouaia et al., 2024).

2.1.3 Digital learning: Stress-Strain-Outcome (SSO) Model

The SSO framework offers a lean approach to the mechanism of how digital stress factors (e.g., unstable connectivity, privacy threat, fear of stigma) cause psychological tension (anxiety, burnout) which is translated into behavioral consequences (avoidance, lack of engagement, low competence) (Koeske and Koeske, 1993; Cao and Yu, 2019; Hu et al., 2024; Pang, 2023). Digital stressors in EFL situations comprise technical failures, concerns about surveillance and cultural pressures, which lead to strain (high SCA and SEA) and consequences of lurking, lower self-efficacy, and poor communicative competence (Gong et al., 2024; Üztemur, 2025; Ma et al., 2025). SSO therefore is a complement to FLA because it focuses on environmental triggers that are peculiar to post-pandemic online education.

2.1.4 Cultural, Sociocultural Theories

Face concern (the need to preserve social harmony and social shame) has been found to exacerbate evaluation apprehension in collectivist societies such as Pakistan (Hu et al., 2024; Toyama, 2022). High collectivism and power distance of Hofstede dimensions are related to having less hesitation to talk in front of people and destroy the group face or individual reputation (Hofstede et al., 2010; Lim, 2009). The importance of scaffolding and mediated interaction is highlighted in Sociocultural Theory (Vygotsky, 1978), but due to poor digital scaffolding in resources-deprived settings, learners are left alone and nervous (Kamalova et al., 2020; Yan et al., 2024).

According to Digital Divide Theory, rural and urban Pakistan is characterized by inequality and anxiety due to the unavailability of quality internet, devices, and digital literacy in rural territories (Clark and Gorski, 2002; Adnan and Anwar, 2020; Abid et al., 2021). Self-Determination Theory (Ryan and Deci, 2000) and Self-efficacy Theory (Bandura, 1977) also imply that frustrated competence, autonomy, and relatedness needs in the online space weaken motivation and increase anxiety and low self-efficacy mediate the anxiety-performance relationship (Zadorozhnyy and Lee, 2025; Boudouaia et al., 2024).

2.2 Empirical Studies

2.2.1 Anxiety in Web-based language Learning Classrooms

The evidence of moderate to high levels of digital interaction anxiety in EFL learners after COVID is global. Almaiah et al. (2022) discovered that social and computer anxiety had significant predictive value of reduced e-learning engagement, and female students had indicated increased privacy concerns. Khan (2022) described technological, academic, and communication obstacles as the main causes of online EFL anxiety in Pakistan and Hanif et al. (2022) written off a 6065% decrease in xenoglossophobia (fear of speaking a foreign language) in virtual classes, although many students still delayed to participate by still having social and technical phobias. Moderate general FLA ($M \approx 3.123.34$) with speaking and classroom

anxiety areas being the most intense are confirmed by recent Pakistani studies (Niazi, 2023; Exploring Foreign Language Anxiety Across Language Skills, 2025; Shams, 2024).

Privacy Concern Anxiety (PCA) also comes out as a very salient but independent variable. Students are afraid of data attacks and sharing accidentally and surveillance, which causes avoidance (Yazgan, 2022; Tukur et al., 2023). Interaction Anxiety (IA) shows itself in the form of the discomfort during the beginning of communication with an unknown peer or instructor in the internet space, whereas Student Evaluation Apprehension (SEA) is increased due to the possibility of noticeable errors in a recorded session or group meeting (Abdel-Al Ibrahim, 2023; Lee and Lee, 2024).

2.2.2 Cultural, Gender, and Contextual Conditions in Asian/Pakistani Conditions

Collectivism and face concern are strong predictors of lurking where students stay silent to demonstrate that they do not disrespect the presenters (Chinese-style lurking) or respect the presenters (Pakistanistani-style lurking) (Hu et al., 2024; Toyama, 2022). The causes of anxiety related to socio-cultural factors, according to Pakistani EFL students, are connected to geographic background, parental expectations, mixed-gender relations, and history of being exposed to English in the form of past experiences (Pakistani EFL University Students Perceptions, 2023; Niazi, 2023). The differences between genders appear to be paradoxical: some researchers believe that females have more chances to enjoy more privacy and have less social anxiety (Almaiah et al., 2022; Yazgan, 2022), whereas other scientists claim that there are no significant differences in the effectiveness of interventions (Behforouz and Al Ghaiti, 2024).

Pakistan is still experiencing the digital divide. Unreliable connectivity and lack of devices are faced by rural students, which aggravates the condition of stress and results in disengagement (Rasool et al., 2023; Sami, 2025). It lacks digital literacy, as well, another element that leads to fear of appraisal when learners struggle to maneuver platforms during live classes.

2.2.3 Digital Interventions and Tools

Anxiety reduction that occurs through technology is gaining momentum. Role-plays and immersions in VR help to reduce stakes and improve self-efficacy (Yan et al., 2024; Zheng et al., 2021). Perceived competence and decreased SEA are enhanced with the help of self-assessment and peer-assessment practices (Abdel-Al Ibrahim, 2023; Ramadan, 2024). Most importantly, chatbots and conversational agents that are powered by AI offer judgment-free, repeatable practice that has a significant reduction in the speaking anxiety and enhances fluency, pronunciation, and confidence (Susoy, 2025; Ding, 2025; Ebadi, 2025; Fauzi et al., 2025; Riaz, 2025; Gholami, 2025). It has been demonstrated that AI chatbots are superior or supplementary to human facilitation in lowering anxiety-performance relationships, particularly in relation to lower-proficiency or anxious students (Susoy, 2025; Effects of incorporating AI chatbots, 2025).

Strain is reduced also by mindfulness, setting goals, and scaffolded group work (Capacio and Datugan, 2024; Alt and Naamati-Schneider, 2021; Badr, 2024). Nevertheless, poorly developed tools may exert a cognitive load, cause technostress (Song et al., 2022; Feng and Liu, 2024).

2.3 Findings and Research Gaps Synthesis

The literature agrees on several issues: (1) the anxiety of digital interaction is multi-dimensional, including SCA, PCA, IA, and SEA; (2) moderate anxiety levels do not disappear in post-pandemic online EFL classes, with SCA and SEA having the most significant relationship with reduced participation; (3) cultural variables (collectivism, face concern) and structural factors (digital divide) contribute more to the

development of these constructs in the context of Asian and Pakistani backgrounds; and (4) low-stakes, AI-based, privacy-enhanced

However, there are still severe gaps. Little research is dedicated to English major students, who have greater professional interests in communicative competence. The four constructs are not often disaggregated or even studied in relation to each other in Pakistani higher education. There is a lack of longitudinal, mixed-method, and experimental studies that experiment with culturally responsive interventions (i.e., AI chatbots with mindfulness or anonymity enabled features). The majority of Pakistani researches are either descriptive or generally EFL-oriented as opposed to English-major specific and construct-oriented (Khan, 2022; Niazi, 2023; Shams, 2024).

The current research has filled these gaps as it maps prevalence and interrelationships among SCA, PCA, IA, and SEA using Pakistani English majors as the interviewee group, explaining the results within the framework of integrated FLA and SSO as well as providing context-sensitive pedagogical recommendations. In such a way, it contributes to the theoretically based, culturally sensitive knowledge on the topic of digital interaction anxiety in EFL environments, which are scarce in resources and highly collectivist.

3. RESEARCH METHODOLOGY

The research took the cross-sectional survey design as a quantitative study in a positivist paradigm to conduct a systematic study to answer the questions regarding the prevalence and association of digital interaction anxiety in a sample of Pakistani undergraduate English major students. The design was selected because it is effective in gathering snapshot data of a specific population in the post-pandemic era when online learning had become accepted but still psychologically challenging (Creswell and Creswell, 2023). The study pursued in particular four theoretically based constructs of Social Communication Anxiety (SCA), Privacy Concern Anxiety (PCA), Interaction Anxiety (IA), and Student Evaluation Apprehension (SEA) construct.

3.1 Participants

The sample size used was the 68 English major undergraduate students in both the public and the private universities in Pakistan. The participants were identified based on purposive and snowball sampling using WhatsApp groups of the respective departments as well as academic social media channels during October and November 2024. The inclusion criteria included: the participants had to be currently enrolled English majors (BS, MA, or MPhil degree), had to have completed at least one academic year of online learning since the transition to COVID-19, and had to be between 18 and 40 years of age.

The overall sample was composed of 42 females (61.8 percent) and 26 males (38.2 percent) which is a representation of the gender ratio in Pakistani English departments. On distribution 50 (73.5) of the respondents resided in rural and 18 (26.5) in urban areas which showed the strength of the digital divide. Participants were in the following age ranges; 25 (36.8) aged 18-25, 21 (30.9) aged 26-30, 17 (25.0) aged 31-35, and 5 (7.4) aged 36-40. Academic status entailed 23 current students (33.8% and 45 who were also in teaching positions (66.2%). The qualification levels were; 13 (19.1) pursuing BS, 36 (52.9) enrolled in MPhil, and 19 (27.9) holding/getting MA degrees.

The sample size is small, but a post hoc analysis of power with G 0 Power (Faul et al., 2009) was used to verify sufficient statistical power (>0.80) to identify a medium-effect size ($r = 0.30$) at <|human|>A post hoc power analysis with G 0 Power (Faul et al., 2009) confirmed a reasonable level of statistical power (>0.80) to detect a medium effect size ($r = 0.30$) at 0.05 in correlation analysis

3.2 Research Instruments

Data were gathered by administration of a structured online questionnaire which has four validated or modified scales on the target constructs on 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The scale contained 21 questions that were spread across the constructs:

Social Communication Anxiety (SCA): 7 scale items based on social media anxiety and communication anxiety scales (e.g. I feel anxious that people will think my online behaviors are awkward).

Privacy Concern Anxiety (PCA): 5 items that pay attention to the data exposure/misuse fears (e.g., I am worried that my personal data may get spread in front of everybody without my permission).

Interaction Anxiety (IA): 6 items about feeling uncomfortable about virtual social interactions (e.g. I am also fearful when talking to new people in on-line classes).

Student Evaluation Apprehension (SEA): 3 questions assessing the fear of negative academic or linguistic judgement (e.g. I am afraid of making a bad impression when I present online courses to them).

At the start of them, demographic questions were added (gender, age, residence, academic status, qualification). The questionnaire was pilot-tested on 15 students of English major that was not part of the main sample. The alpha reliability coefficients of all constructs were above 0.80 (SCA $\alpha = .87$, PCA $\alpha = .91$, IA $\alpha = .84$, SEA $\alpha = .82$) which implies good internal consistency and applicability in the Pakistani EFL environment (Nunnally and Bernstein, 1994).

3.3 Data Collection Procedure

The questionnaire was given online through Google Forms. A survey was preceded by an information sheet and electronic informed consent form, which accentuated voluntary participation, withdrawal right, anonymity, and confidentiality. No incentives were offered. The survey link was disseminated within the university gatekeepers via official channels and student groups. The data collection process took place within six weeks (mid-October to the end of November 2024). In this study, among the 75 responses obtained, 7 blank responses were omitted, leaving 68 valid responses (90.7% response rate). The average time of completion was 15-20min.

3.4 Data Analysis

IBM SPSS statistics version 27 were used in data analysis. The descriptive statistics (means, standard deviations, frequencies, and percentages) were set because of establishing the levels of anxiety on each construct and item. The associations between SCA, PCA, IA and SEA were tested with Pearson product-moment correlation coefficient. Before analysis, assumptions of normality, linearity, and homoscedasticity were verified using Shapiro-Wilk tests and scatterplots; no severe offences were noted ($p > .05$ significant in the majority of variables). Statistical insignificance was established at $p < .05$ with the interpretations of effect sizes based on the rules of Cohen (1988) (small $r = .10$, medium $r = .30$, large $r = .50$).

3.5 Ethical Considerations

The research was also acceptable by the departmental research ethics committee of the universities involved. Every action was in line with the ethical standards of the Declaration of Helsinki and APA

ethical standards. The data of the participants were kept safely in password-controlled devices and no personal data were gathered.

Such a methodological solution offered credible and measurable data regarding digital interaction anxiety and it considered the contextual reality, which was the Pakistani English majors in post-pandemic online learning settings.

4. RESULTS

This section outlines the demographic profile of sample participants and the descriptive and correlational results of the four constructs of digital interaction anxiety namely; Social Communication Anxiety (SCA), Privacy Concern Anxiety (PCA), Interaction Anxiety (IA), and Student Evaluation Apprehension (SEA). All the analyses were made through the IBM SPSS statistics version 27.

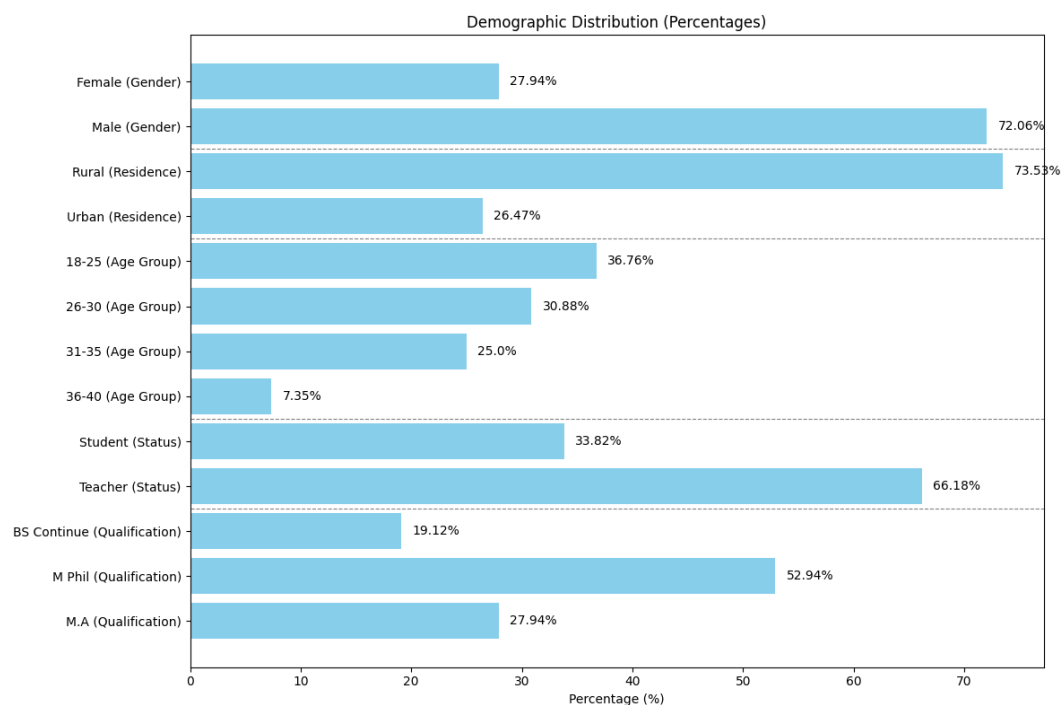
The demographic profile of the participants will be presented in 4.1.

A total of 68 undergraduate English majors students of Pakistani public universities and private universities were involved in the study. Table 1 is a summary of the demographic features described in the study.

Table 1 Demographic Characteristics of Participants (N = 68)

Variable	Category	Frequency	Percentage (%)
Gender	Female	42	61.8
	Male	26	38.2
Residence	Rural	50	73.5
	Urban	18	26.5
Age Group	18–25	25	36.8
	26–30	21	30.9
	31–35	17	25.0
	36–40	5	7.4
Academic Status	Student only	23	33.8
	Student & Teacher	45	66.2
Qualification	BS (Continuing)	13	19.1
	MPhil	36	52.9
	MA	19	27.9

The sample was quite rural and female-based, which was an approximation of the gender distribution and geographic nature of the English programs in most Pakistani universities. The number of participants who utilized studies along with teaching roles was a significant percentage, which pointed to mature and professionally engaged learners.



Graph No. 1

4.2 Digital Interaction Anxiety Constructs Descriptive Statistics

All constructs were measured using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The levels of anxiety were moderate with construct means of between 3.07 and 4.00.

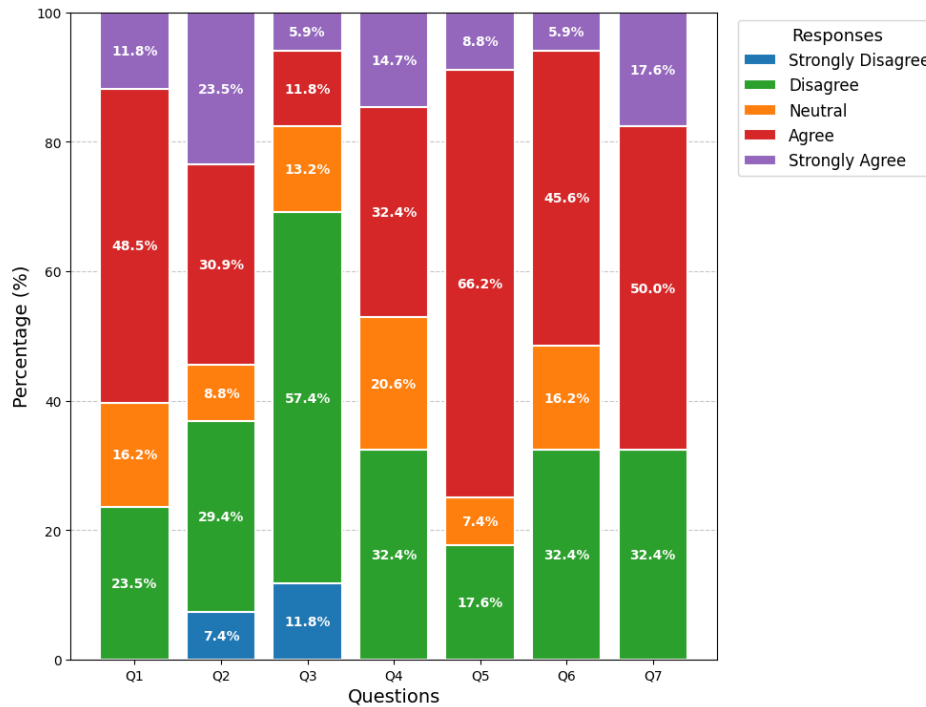
Table 2 Descriptive Statistics and Item Analysis for Social Communication Anxiety (SCA) (7 items, M = 3.28, SD = 1.12)

Item	Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	M	SD
1	Anxious others find actions awkward	11.8	48.5	16.2	23.5	0.0	3.49	0.98
2	Concerned about being ridiculed	23.5	30.9	8.8	29.4	7.4	3.34	1.32
3	Concerned content not liked	5.9	11.8	13.2	57.4	11.8	2.43	1.04
4	Afraid close friends not approve	14.7	32.4	20.6	32.4	0.0	3.29	1.08
5	Uncomfortable friends express dislike	8.8	66.2	7.4	17.6	0.0	3.66	0.87
6	Concerned about disapproval of behaviours	5.9	45.6	16.2	32.4	0.0	3.25	0.98
7	Concerned judged about content by friends	17.6	50.0	0.0	32.4	0.0	3.53	1.13

Moderate overall Social Communication Anxiety (SCA) was found among the Pakistani English Majors (M = 3.28 on a 5-point Likert scale, SD = 1.12), which appeared to be a salient factor in the study. The most positive item (Item 5: “Uncomfortable friends express dislike” M = 3.66, SD = 0.87; 66.2% Agree + 8.8% Strongly Agree) indicates high anxiety of facing disapproval from others, reflecting collectivist cultural values, which focus on face-saving and social harmony in Pakistan (Hu et al., 2024; Toyama, 2022). Items 1 (“Anxious others find actions awkward,” M = 3.49) and 7 (“Concerned judged about content by friends,” M = 3.53) continue to highlight a sense of self-consciousness in online social actions.

However, Item 3 “Concerned content not liked” (M = 2.43) has the lowest anxiety, indicating that students are fairly tolerant of disapproval of content but greatly sensitive to disapproval of others. High agreement rates (48.5% Agree on Item 1, 50% on Item 7) in conjunction with the significant neutral responses (up to 20.6%) suggest difficulties with transitional adaptation after COVID.

Percentage Distribution of Responses for Shared Content Anxiety (SCA)



Graph No. 2

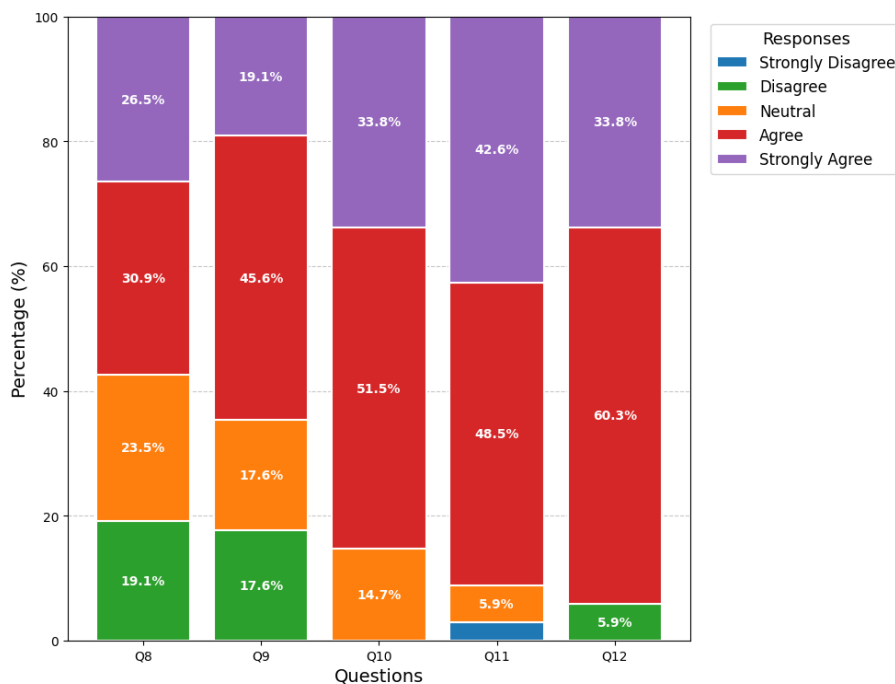
The standard deviations (0.87-1.32) are explained by the variability of the responses, which are possibly related to rural-urban differences and mixed roles of both students and teachers. This moderate SCA level (with good SCA-SEA correlation $r=0.663$ in Table 6) is in line with the theory of Foreign Language Anxiety (FLA) (Horwitz et al., 1986) and the Stress-Strain-Outcome (SSO) model, which suggests that digital stressors such as webcams and recorded sessions amplify anxiety about social evaluation. These results have implications for English majors, for whom communicative competence is critical to their professional lives, and they show potential for lurking behaviors and diminished participation. Pedagogically, Table 2 suggests that low-stakes and anonymous activities, and a culture of positive feedback can help reduce SCA and promote psychological safety in online EFL classrooms.

Table 3 Descriptive Statistics and Item Analysis for Privacy Concern Anxiety (PCA) (5 items, M = 4.00, SD = 0.91)

Item Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	M	SD
8 Possibility private info acquired	26.5	30.9	23.5	19.1	0.0	3.65	1.08
9 Possibility private info shared publicly	19.1	45.6	17.6	17.6	0.0	3.66	0.99
10 Uneasy friends share private info	33.8	51.5	14.7	0.0	0.0	4.19	0.67
11 Concerned personal space accessed	42.6	48.5	5.9	0.0	2.9	4.28	0.83

Item Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	M	SD
12 Anxious about social media privacy policy	33.8	60.3	0.0	5.9	0.0	4.22	0.73

Percentage Distribution of Responses for Privacy Concern Anxiety (PCA)



Graph No. 3

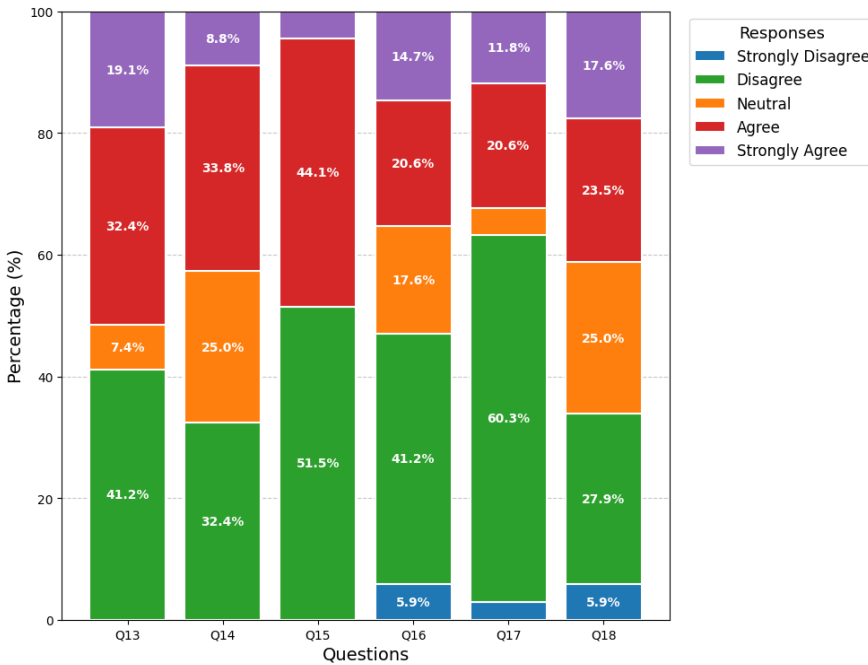
Table 3 shows that the highest construct anxiety was found in Privacy Concern Anxiety (PCA) with $M = 4.00$ and $SD = 0.91$; indicating that the most generalized anxiety regarding data security and exposure was found in the English majors of Pakistan. This raised mean puts PCA in the spotlight as the most prevalent digital stressor in the sample. Items 11 (“Concerned personal space accessed,” $M = 4.28$) and 12 (“Anxious about social media privacy policy,” $M = 4.22$) have extremely high concerns scores with 42.6% Strongly Agree + 48.5% Agree on Item 11 and almost unanimous agreement that privacy policies are a concern ($M = 4.22$). Another interpersonal privacy concern in social networks is highlighted in Item 10 (“Uneasy friends share private info,” $M = 4.19$). The SDs were relatively low (0.67–1.08) indicating that the level of anxiety was relatively high and consistent among respondents, whereas other constructs had more variable SDs. With no responses or near zero responses across the items, these concerns are echoed as widespread across the country, compounded by fears of surveillance, lack of robust data protection and frequent platform glitches (Tukur et al., 2023; Yazgan, 2022). Although high PCA, Table 6 demonstrates low or negative correlations with other constructs (e.g., $r = -0.302$ with IA), suggesting that privacy concerns lead to avoidance (lurking) instead of discomfort in interacting with the technology. This independence enables to develop the FLA theory by adding technology-specific stressors to the SSO model. Unreliable infrastructure may be making vulnerable to the perception of vulnerability for those who are rural majority (73.5%). To be practical, it is recommended that the following institutional interventions be taken: (1) platforms designed to respect privacy, (2) digital literacy training on settings and data rights, and (3) clear institutional policies. If not treated, English majors may be chronically disengaged which may negatively impact their communicative practice and potential as educators and professionals.

Table 4 Descriptive Statistics and Item Analysis for Interaction Anxiety (IA)

(6 items, M = 3.07, SD = 1.15)

Item	Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	M	SD
13	Anxious talking with new people	19.1	32.4	7.4	41.2	0.0	3.29	1.20
14	Nervous talking with unfamiliar people	8.8	33.8	25.0	32.4	0.0	3.19	1.00
15	Uneasy making new friends online	4.4	44.1	0.0	51.5	0.0	3.01	1.07
16	Tense meeting someone first time online	14.7	20.6	17.6	41.2	5.9	2.97	1.21
17	Afraid of interacting with others	11.8	20.6	4.4	60.3	2.9	2.78	1.17
18	Nervous talking about myself	17.6	23.5	25.0	27.9	5.9	3.19	1.20

Percentage Distribution of Responses for Interaction Anxiety (IA)



Graph No. 4

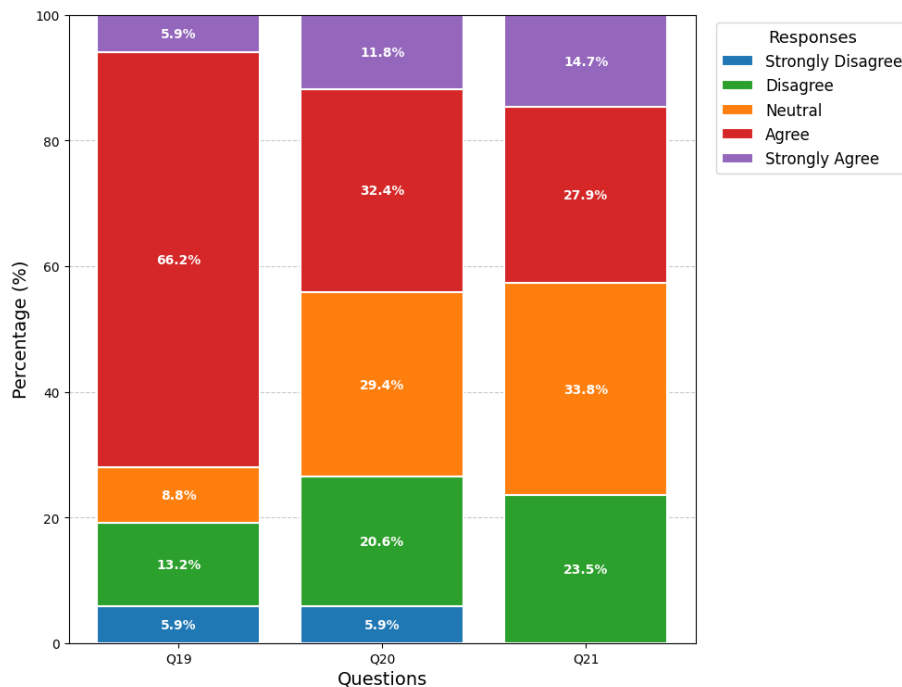
According to the results presented in Table 4, the overall anxiety level was the lowest for Interaction Anxiety (IA, M = 3.07, SD = 1.15), indicating that in general, Pakistani English majors are not as uncomfortable as they are with social judgment or privacy anxiety when engaging in online interactions. Items present mixed patterns with Item 13 (Anxious talking with new people), M = 3.29 and Item 14 (Nervous talking with unfamiliar people) being moderately high, and Item 17 (Afraid of interacting with others), M = 2.78 being the lowest score. This implies greater unease with novel encounters than general interaction. The moderate SDs (1.00–1.21) and high proportion of Disagree responses on the items (e.g.,

51.5% for the item “Adaptation in asynchronous/chat features post-COVID” highlight adaptation in the features of the asynchronous/chat environment. However, the presence of neutral answers (up to 25%) and the rural composition of the samples indicate that there are still challenges remaining from the lack of practice opportunities and the digital divide. In Table 6, the moderate positive correlation with SCA ($r=0.331$, $p<.05$) and negative correlation with PCA ($r=-0.302$) point to complex dynamics – social fears can lead to interaction reluctance, whereas privacy concerns can drive into withdrawal as a coping mechanism. In the context of FLA and SSO, IA is a manifestation of strain that poses a threat to interactive practice to which English majors adhere in order to become proficient. Table 4 thus indicates that there is some adaptation but also a lack of adaptation. Scaffolded icebreakers, AI chatbots for low-stakes rehearsal (Susoy, 2025), and mixed-mode activities are suggested to develop interaction confidence. It is important to incorporate IA along with more powerful constructs such as SCA and PCA to improve the engagement, self-efficacy and communicative competence among the online EFL learners in Pakistan.

Table 5 Descriptive Statistics and Item Analysis for Student Evaluation Apprehension (SEA) (3 items, $M = 3.37$, $SD = 1.03$)

Item	Statement	SA (%)	A (%)	N (%)	D (%)	SD (%)	M	SD
19	Anxious about negative impression	5.9	66.2	8.8	13.2	5.9	3.53	1.00
20	Concerned people thinking poorly of me	11.8	32.4	29.4	20.6	5.9	3.24	1.09
21	Anxious not meeting expectations	14.7	27.9	33.8	23.5	0.0	3.34	1.00

Percentage Distribution of Responses for Self-Evaluation Anxiety (SEA)



Graph No. 5

This moderate SEA score strongly supports the strong positive correlation with Social Communication Anxiety (SCA) as seen in Table 6 ($r = 0.663$, $p < .01$), wherein the fear of being socially awkward directly contributes to evaluation apprehension. The results of this study further support the Foreign Language

Anxiety (FLA) theory by Horwitz et al. (1986), specifically the fear of negative evaluation factor, and the Stress-Strain-Outcome (SSO) model by placing the digital stressors (such as webcams, recordings, peer visibility) as a source of psychological strain, which in turn raises avoidance behaviors (lurking). For English students, whose career prospects rely on their ability to communicate effectively in English, unregulated SEA can damage self-efficacy, engagement and mastery of English. In terms of pedagogy, as per Table 5, the interests of using low-stakes participation options, constructive feedback protocols, self-assessment tools, and AI-supported rehearsal environments are highlighted (Abdel-Al Ibrahim, 2023; Susoy, 2025; Ramadan, 2024). In Pakistan's higher education system in the aftermath of the pandemic, if SEA is not specifically tackled to address cultural face concern and digital visibility, it will continue to be a hurdle for competent and confident EFL professionals.

4.3 Correlations between Constructs.

The analysis of Pearson correlation showed that there are a number of significant relationships (see Table 6).

Table 6 Pearson Correlation Matrix Among Digital Interaction Anxiety Constructs (N = 68)

Construct	SCA	PCA	IA	SEA
SCA	1.000	-0.100	0.331*	0.663**
PCA	-0.100	1.000	-0.302*	0.009
IA	0.331*	-0.302*	1.000	-0.066
SEA	0.663**	0.009	-0.066	1.000

* $p < .05$, ** $p < .01$ (two-tailed)

The highest correlation was a big positive association was between SCA and SEA ($r=0.663$, $p<.01$), and it is observed that the students who were afraid of awkward or negatively judged social communication online also had increased apprehension of academic and linguistic assessment. There was an intermediate positive relationship between IA and SCA ($r = 0.331$, $p < .05$). On the other hand, there is a moderate negative relationship between PCA and IA ($r = -0.302$, $p < .05$) implying that increased privacy concerns were correlated with increased avoidance of interaction. PCA was not much dependent on the other constructs. These results affirm moderate and yet diversified rates of digital interaction apprehension in Pakistani English majors with SCA coming out as the primary construct with the strongest association to evaluation fears.

5. DISCUSSION

The present research investigated the digital interaction anxiety among the post-pandemic online EFL environment English major Pakistani students using four theoretically based constructs including: Social Communication Anxiety (SCA), Privacy Concern Anxiety (PCA), Interaction Anxiety (IA), and Student Evaluation Apprehension (SEA). On the whole, the results indicate moderate degrees of digital interaction anxiety (construct means are between 3.07 and 4.00 using a 5-point Likert scale) with SCA and SEA being of specific interest. Such findings also apply classic Foreign Language Anxiety (FLA) theory (Horwitz et al., 1986) and the Stress-Strain-Outcome (SSO) model (Hu et al., 2024; Gong et al., 2024) to a culturally specific, digitally mediated Pakistani higher education context.

The most important is the moderate level of SCA ($M = 3.28$) and the strong positive correlation with SEA ($r = 0.663$, $p < .01$). Such a strong association suggests the concerns about the socially embarrassing or otherwise appraised actions on the Internet directly increases anxiety about academic and language appraisal. In online EFL classrooms where speaking and interactive activities play the most critical role in

developing the skill, students who fear the consequences of social faux pas are also highly concerned of the negative impression that fellow students and teachers may harbor towards them. This trend corresponds to the fear of negative evaluation element of Horwitz et al. (1986) and the recent digital extensions indicating that the addition of webcams and permanent digital documentation to privacy increases self-surveillance and evaluation anxiety (Huang et al., 2025; Zheng et al., 2021; Abdel-Al Ibrahim, 2023). Such fears are also exaggerated in the collectivist culture of Pakistan where face concern and social harmony are prioritized, which usually causes a decrease in willingness to communicate and passive lurking (Hu et al., 2024; Toyama, 2022; Khan, 2022).

Privacy Concern Anxiety, the highest mean ($M = 4.00$) was obtained, which confirms the notion that the issues of whether data are safe, whether they are distributed unlawfully, and whether they are monitored is still very prevalent among Pakistani students. Nevertheless, PCA demonstrated weak or negative correlations with other constructs, the strongest of which is a moderate negative correlation with IA ($r = -0.302$, $p < .05$). This indicates that students with high levels of privacy fear will avoid active interaction hence they have less conscious interaction anxiety by withdrawal. This avoidance can be explained by the aspect of lurking as a culture-adaptive coping behavior in Asian collectivist settings, where face is of greater importance than the rewards of attending (Hu et al., 2024; Baimakhan et al., 2024). The comparative autonomy of PCA justifies the inclusion of the concept as a unique techno-stressor in the SSO paradigm instead of being a direct development of conventional FLA (Cao and Yu, 2019; Pang, 2023).

Interaction Anxiety ($M = 3.07$) was the least construct, which also suggests that the overall uneasiness in virtual conversations is not as high as social-judgment or privacy anxieties. This could be due to some adaptation to the online platforms after the COVID period when asynchronous features and chat-based options provide the opportunity to be somewhat engaged without the urgency of being in contact with a partner (Hanif et al., 2022; Rasool et al., 2023). The positive correlation between SCA and IA ($r = 0.331$, $p < .05$) however, indicates that fears of social communication continue to spill to interaction reluctance in general, undermining the much needed practice of talking English majors need to develop to become competent professionals.

Such a high degree of ambivalence on items (decisive answers of 33.8) also indicates that a large number of students are still at a transitional stage of digital adaptation. Probably, this uncertainty is brought about by the infrastructural problems, which remain unresolved, the lack of digital literacy, and the lack of a resolution to the cultural conflict between traditional norms of face-to-face society and those of the online environment (Adnan and Anwar, 2020; Sami, 2025; Niazi, 2023). The fact that the sample is predominantly rural (73.5%) highlights how the digital divide is perpetuating anxiety: the lack of reliable connection and device restrictions turn the potential learning opportunities into a cause of stress (Clark and Gorski, 2002; Abid et al., 2021).

There are significant theoretical implications of these findings. To start with, they confirm the usefulness of the combination of FLA and SSO models in learning about the digital interaction anxiety in the non-Western, resource-constrained contexts. The prevailing SCASEA association illustrates that cultural face concern effect prevails as a strong mediator between the digital stressor and the psychological strain. Second, the specificity of PCA suggests the necessity to broaden the classical FLA models and apply them to the new dimensions of technology-related privacy that gain more and more relevance in the post-pandemic period (Tukur et al., 2023; Yazgan, 2022). Third, the findings support self-efficacy and self-determination theories by demonstrating that anxiety compromises competence needs and results in avoidance which, furthermore, poses a threat to language proficiency and engagement (Bandura, 1977; Ryan and Deci, 2000; Zadorozhnyy & Lee, 2025; Boudouaia et al., 2024).

Practically, the study highlights that there is an urgent need of specific interventions. Low-stakes activities with anonymous participation, well-articulated interaction culture, and positive feedback culture should be a priority of universities to minimize SCA and SEA. The issues of privacy may be resolved through explicit training on platform usage, data protection regulations and the implementation of privacy-by-design solutions. Scaffolded self-assessment, video reflection, and personalized chatbots provide opportunities of low threat practices that would build self-efficacy and counter avoidance to find an opportunity (Yan et al., 2024; Susoy et al., 2025; Ramadan, 2024; Abdel-Al Ibrahim, 2023). The digital divide should also be addressed by institutional means such as subsidized internet, lending of devices, and digital literacy workshops that target the rural area. Mindfulness and resilience training might be another benefit of teaching EFLs because it would help students overcome evaluative fears (Capacio and Datugan, 2024; Alt and Naamati-Schneider, 2021).

These moderate levels of anxiety, alongside a high degree of SCA-SEA correlation and avoidance based on the element of privacy, indicate that, in the absence of organized intervention, the digital interaction anxiety is likely to persist in affecting communicative competence, self-esteem, and future professional readiness among English majors. As potential teachers, translators and global communicators, these students are critical to the development of Pakistan in terms of education and the economy. Their digital interaction anxiety thus, is not only a pedagogical necessity, but also a question of educational equity and development of the national human capital.

6. CONCLUSION

This paper examined the digital interaction anxiety in 68 Pakistani undergraduate English major students in post-pandemic online EFL learning settings. Based on Foreign Language Anxiety (FLA) theory and Stress-Strain-Outcome (SSO) model, the study considered four important constructs, such as Social Communication Anxiety (SCA), Privacy Concern Anxiety (PCA), Interaction Anxiety (IA), and Student Evaluation Apprehension (SEA). The results show moderate general levels of digital interaction anxiety, the most central and problematic construct of which is SCA. The high positive correlation between SCA and SEA ($r = 0.663$, $p < .01$) shows that the fear of embarrassment or feelings of being judged negatively in online social contexts are major contributors to the feeling of evaluation apprehension in virtual EFL classrooms. Conversely, PCA had the greatest mean value ($M = 4.00$) and was rather independent with a moderate negative correlation with IA ($r = -0.302$, $p < .05$). This trend indicates that the issue of privacy tends to be an avoidance behavior like lurking and, thus, diminishes conscious anxiety of interaction but leaves necessary language practice opportunities unavailable.

These findings contribute to the current theoretical perspectives by showing how the cultural variables, especially, collectivism and face concern in the Pakistani culture, combine with digital stressors to influence anxiety levels. The digital divide that has continuously prevailed, the ambivalence among students (up to 33.8% undecided) and the particular pressures that should be managed by English majors as a student and as a future employee make the findings contextual even more. Left unattended, this anxiety is a threat to the communicative competence, self-efficacy, engagement, and the final academic and career output.

6.1 Practical Recommendations

In order to reduce the fear of digital interaction and encourage the fair online EFL learning, a number of evidence-based interventions should be suggested. Firstly, through establishing transparent regulations against negative judgement, icebreakers, anonymity of participation and well-organized positive feedback systems, teachers should make the online learning environment psychologically safe. Second, training in privacy settings in platforms, data security, and effective communication practices will curb the problem

of privacy through digital literacy. Third, scaffolded self-assessment, video reflection, and AI-based conversational agents ought to be combined to deliver low-stakes repeatable practice with the construction of self-efficacy and the elimination of evaluation apprehension (Susoy et al., 2025; Yan et al., 2024; Abdel-Al Ibrahim, 2023). Fourth, universities need to overcome the digital divide through subsidized internet access, equipment lending, and technical assistance especially to students in rural areas. Lastly, incorporating short mindfulness and resilience training into EFL curricula can allow students to cope with social-evaluative fears in a better way (Capacio and Datugan, 2024).

6.2 Limitations

There are a number of limitations that need to be considered. The non-probability sampling (N = 68) and the relatively small sample size restrict the ability to apply the results to the entire Pakistani English majors and, in particular, to the majors in the remote or under-resourced institutions. The cross-sectional structure does not allow making any causal conclusions about the relations between constructs. Use of self-reported Likert scale data creates the possibility of social desirability and recall bias, which could be captured in the high percentage of undecided responses. Also, although the data and the literature led to the inference of the cultural and technical aspects, they were not directly measured using validated scales specific to the Pakistani context.

6.3 Future Research Directions

Future research ought to utilize longitudinal designs as an attempt to monitor how digital interaction anxiety emerges and continues over semesters. A mixed methods method (qualitative interviews, or focus groups) would give further understanding of the lived experience of students, especially the contribution of face concern and lurking behavior in collectivist societies. Generalizability could be improved by larger, stratified samples that would represent various geographic, socioeconomic and institutional contexts. The study requires experimental and quasi-experimental studies to determine how effective culturally responsive interventions like AI chatbots, VR role-plays, anonymous collaboration tools, and mindfulness programs are in reducing the four constructs of digital interaction anxiety. Lastly, studies of comparison between South Asian EFL settings and the research of moderating factors (gender, proficiency level, previous exposure to digital devices, and socioeconomic status) would contribute more to the theoretical knowledge and pedagogical practice.

To sum up, the anxiety to interact digitally is one of the key, but not insoluble obstacles to successful online EFL learning with Pakistani English majors. Through the combination of psychological safety, privacy protection, technological scaffolding, and fair access into digital pedagogy, teachers and policy makers can shape more confident, competent, and better prepared to work in the globalized world English language professionals. This will not only improve the personal performance of individual students but will also add value to more comprehensive objectives of educational justice and national progress in a world that is increasingly digital.

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