Conversational Artificial Intelligence Dependency, Self Disclosure to Others, Social Connectedness among University Students

YUMNA SHAHZAD

03-171221-009

BAHRIA UNIVERSITY LAHORE CAMPUS

Conversational Artificial Intelligence Dependency, Self Disclosure to Others, Social Connectedness among University Students

YUMNA SHAHZAD

03-171221-009

A thesis submitted in fulfillment of the
requirements for the award of the degree of
Bachelors of Science (Psychology)

Department of Professional Psychology

BAHRIA UNIVERSITY LAHORE CAMPUS

19 December 2025

Approval for Examination

Scholar's Name: Yumna Shahzad

Registration No: 78822

Program of the study: Bachelors of Science in Psychology

Thesis Title:

I hereby confirm that I am satisfied with the completion of the scholar's thesis, and I believe it meets the appropriate standards for examination and submission. The Plagiarism test, conducted using the HEC prescribed software, returned a similarity index of ____, which is within the permissible limit set by the HEC for BS degree thesis. Additionally, the thesis adheres to BU's recognized format for BS thesis.

Principal Supervisor Signature:

Date:

Name:

Declaration

I, Yumna Shahzad hereby state that my BS thesis titled **“**Conversational Artificial Intelligence Dependency, Self Disclosure to Others, Social Connectedness among University Students” is my own work and has not been submitted previously by me for taking any degree from the university Bahria University or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw/cancel my degree.

Name of student: Yumna Shahzad

Date: 19-December-2025

Plagiarism Undertaking

I, solemnly declare that the research work presented in the thesis titled "Conversational Artificial Intelligence Dependency, Self Disclosure to Others, and Social Connectedness among University Students" is solely my research work with no significant contribution from any other person. Small contribution/help wherever taken has been duly acknowledged and that complete thesis has been written by me.

I understand the zero tolerance policy of the HEC and Bahria University Lahore Campus towards plagiarism. Therefore I as an author of the above titled thesis declare that no portion of my thesis has been plagiarized and any material used as reference is properly referred/cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of BS degree, the university reserves the right to withdraw/revoke my BS degree and that HEC and the University has the right to publish my name on the HEC/University website on which the names of the students are placed who submitted plagiarized thesis.

Scholar's Sign: _____

Name of Student: Yumna Shahzad

Dedication

To my parents, for their endless love, guidance, and unwavering belief in me.

And to my siblings, for their constant support, laughter, and inspiration every step of the way.

Acknowledgement

All praise and gratitude are due to ALLAH Almighty, whose blessings, guidance, and mercy have enabled me to complete this research successfully. HIS support has given me strength, patience, and clarity throughout this journey.

I am deeply thankful to my parents for their unconditional love, encouragement, and sacrifices. Their belief in me and constant support inspired me to overcome challenges and remain focused. To my siblings, thank you for your care, motivation, and understanding, which kept me positive and encouraged throughout this work.

I am profoundly grateful to my supervisor Miss Saima Bano for their guidance, constructive feedback, and expert advice, which greatly enhanced the quality of this research and my learning experience.

Finally, I wish to acknowledge everyone who contributed, directly or indirectly, to the completion of this study. Your support, encouragement, and advice have been invaluable, and I am truly thankful to all who helped me along this journey.

Yumna Shahzad

Abstract

The growing utilization of conversational artificial intelligence (CAI) among university students has plenty of concerns about its consequences on psychological and societal effects. The present study has looked at association between conversational AI dependency, self disclosure to others and social connectedness among Pakistani university students. Data from 300 students studying at public and private universities in Lahore between the ages of 17 and 28 years was obtained using cross sectional quantitative design. Standardized assessments measuring social connectedness, self discloure to others, and conversational AI reliance were filled out by respondents. 50% of students found themselves utilizing conversational AI numerous times a day, according to descriptive statistics. Conversational AI reliance has been proved to be negatively connected with social connectedness ($r=-.297$, $p<.01$) and strongly associated with self disclosure ($r=.416$, $p<.01$), in line with results of correlation analysis. Conversational AI reliance has been demonstrated to be important predictor of both social connectedness ($B= 0.416$, $p<.001$). As the indirect effect was not major or significant, the analysis of mediation suggested that self disclosure failed to mediate the relationship between conversational AI reliance and social connectedness. In summary, the outcomes tells that conversational AI use fails to enhance social connectedness but it does enhances likelihood of students to open up to others. The research also stresses how social settings and stressful circumstances disclosure affect the mental wellness of university students.

Keywords: *Conversational Artificial intelligence Dependency, Self Disclosure, Social Connectedness, University Students*

Table of Contents

Approval for Examination 3

Plagiarism Undertaking 5

Abstract 8

Chapter 1 17

Introduction: 17

1.1 Conversational Artificial Intelligence: 18

1.2 Self-Disclosure: 19

1.3. Social Connectedness: 22

1.4. CAI and Students: 25

Chapter 2 27

Literature Review 27

2.1 Theoretical framework: 38

2.1.1. Social penetration theory: 38

2.1.2 Displacement theory 39

2.1.3. Media Richness Theory: 40

2.1.4. Compensatory Internet Use Theory: 41

2.1.5. Conceptual Model: 41

2.2. Problem statement: 41

2.3. Research objectives 42

2.4. Hypothesis: 43

2.5. Significance: 43

2.6. Rationale: 44

Chapter 3 46

Research Methodology....46
3.1. Research Design....46
3.2. Population and Sampling:....47
3.2.1. Inclusion criteria:....47
3.2.2. Exclusion Criteria:....47
3.3. Data Collection....47
3.3.1. Informed Consent:....48
3.3.2. Demographic form:....48
3.4. Assessment measures:....48
3.4.1. Conversational AI Dependency:....48
3.4.2. Self-Disclosure to other people:....49
3.4.3. Social Connectedness:....49
3.5. Procedure:....50
3.6. Data Analysis:....50
3.7. Ethical Considerations:....51
Chapter 4....52
RESULTS....52
Chapter 5....66
Discussion....66
5.1. Implication of Study:....70
5.2. Strength of Study:....70
5.3. Limitations:....71
5.4. Future Research Direction:....71
5.5. Conclusion:....72
References....73

Appendix 80
SECTION III 86

List of Tables

4.1	Descriptives and demographics
4.2	Reliability and Validity
4.3	Correlation of all scale's
4.4	Regression Coefficient of Conversational Artificial Intelligence Dependency on Self Disclosure
4.5	Regression Coefficient of Conversational Artificial Intelligence Dependency on Self Disclosure
4.6	Mediation of Self Disclosure
4.7	Mean comparing of Frequency of using CAI
4.8	Mean comparing of Program of study
4.9	Mean comparing of Gender

List of Figures

Figure No		Page No
2.1.5	Pictorial Representation of Theoretical Model	41
4.6	Results of Hayes Model of Mediation	62

List of Abbreviations

Abbreviations	Full Form
APA	American Psychological Association
SPSS	Statistical Package for the Social Sciences
CAI	Conversational Artificial Intelligence Dependency
SD	Self Disclosure
SC	Social Connectedness

List of Symbols

Symbol	Full Form
α	Alpha Cronbach's Index of Internal Consistency
β	Standardized Coefficient
f	Frequency
M	Mean
SD	Standard Deviation
%	Percentage
r	Correlation Coefficient

List of Appendices

Appendices		Page No.
Appendix A	Permission Letter from Department of Professional Psychology	81
Appendix B	Consent Form	82
Appendix C	Questionnaire	83
Appendix D	Permission from Author	90
Appendix E	Plagiarism Report	107

Chapter 1

Introduction:

In the upcoming world, intelligent machines are believed to enhance or even replace human skills in many fields. Artificial intelligence (AI), a computer science branch, refers to the intelligence displayed by machines or software. Over the past two decades, AI has significantly improved performance across various areas, especially in education, engineering, business, medicine, and weather forecasting (Patil et al., 2023). As AI continues to advance, many companies now rely on chatbots to make their online services quicker and more personal. This idea became popular during the COVID-19 pandemic when face-to-face interactions declined. Using AI and machine learning, these virtual assistants (chatbots) can understand and talk with people naturally (Altarif & Mubarak, 2022). These Artificial Intelligence (AI) Chatbots have been made available to the public in recent years (Zhang et al., 2025). Their roles in Education, intimate relationship or in society has been reviewed and researched at large. The types of AI Chatbots are Conversational AI chatbots, Voice based Chatbots, Generative AI chatbot, and Hybrid Chatbots. Conversational Artificial intelligence are chatbots or virtual assistants that can intelligently answer your questions and can even converse with you. But over-reliance on CAI can significantly impact a person's growth and ability to adapt (Chen et al., 2025). Prior studies have shown the association between conversational AI dependance and social withdrawal. This study examines the extent and nature of Conversational AI usage or dependence among students, moreover, examines the negative impact of CAI dependency on social connectedness with mediating role of self-

disclosure investigating how CAI dependency can affect individuals' self-disclosure to other people. This research seeks to fill the gap within the present literature in Pakistan about use of conversational artificial intelligence among Pakistani students and to provide empirical evidence to see how Pakistani student's dependency on conversational artificial intelligence (CAI) can affect on their regular social life.

1.1 Conversational Artificial Intelligence:

According to Khatri et al. (2018) Conversational Artificial intelligence are digital bots that engage in human type conversation with human users. The example of CAI is Amazon, ChatGPT, Replika, Siri. ChatGPT, which is made by OpenAI, has taken over the world so rapidly that it had 100 million users in just a few days (Soham, 2023). A survey was done in 8 countries across the world in which the results showed that participants believed that AI will be revolutionary but only 1-2% believed that it will not have effect in the long run (Kelley et al.,2021). It shows the impact of AI on a lot of individuals.

Research shows that people use AI Chatbots to fulfill their social needs, especially by people who feel lonely. In a survey of 2024 on adults, it was seen that the leading reason to use chatbot initially was due to curiosity towards AI and Chatbots. Around 30.9% of people did it for this reason. Around 12.2% of people used it to cope with loneliness, and 7.2% for improving social and conversational skills (Liu et al., 2025). In another research it was seen 14.6% Danish high school students had friend like conversation with a chatbot (Herbener & Damholdt, 2025). This shows how many

people, like students, are involved with chatbots and have human-like conversations with them. Moreover, a longitudinal study on adults where they were asked to engage with conversational AI showed that active usage of CAI led to high perceived attachment to AI, seeking emotional support and discussing health with AI, also that 2.44% students seek emotional support from none other than chatbots and study also emphasized the need to consider problematic usage of chatbots (Chandra et al.,2025). All these shows that people adopt Conversational AI to foster social connections but those who seek emotional or any social support often reports low social connectedness, maybe because CAI is seen as compensation of human interaction and social support that is non-judgmental.

In Pakistan, thousands of people use ChatGPT daily to manage anxiety and to vent out their emotions and feeling to it (Amjad, 2025). The over reliance on conversational AI or daily use of it can lead to an increase in loneliness, more dependence and low socialization (Fang et al., 2025). Not only this, the negative effects related to cognition and decision making have also become dominant if there is reliance on AI. Non availability of AI use in taking decision related to medical can also lead to decision paralysis if an individual is overly relied on it (Jussupow et al.,2021). So, overdependence can lead to issues emotionally and socially for an individual.

1.2 Self-Disclosure:

When a person purposefully discloses to others their personal information, emotionality or thoughts, then this process is called self-disclosure (Rime, 2016). In

psychotherapy, a client can have therapeutic improvement if he explains or discloses his innermost ideas, feelings and fears and experiences (American Psychological Association, 2023). Social penetration theory is important for self-disclosure. Self-Disclosure is also important for interpersonal relationships where it takes relationships to the next level (Taylor & Altman, 1975, 1987, as cited in Carpenter & Greene, 2016). Moreover, Self-disclosure also happens in friendships, in social group, in work professional relationships and now even in computer mediated communications (Carpenter & Greene, 2016).

Psychologically, self-disclosure activates neural mechanisms related to reward, with people finding intrinsic value and satisfaction in revealing aspects of themselves, which foster feelings of closeness and belongingness (Tamir & Mitchell, 2012). The gradual and reciprocal nature of self-disclosure facilitates emotional support and empathy, improving relational quality and social connectedness (Derlega & Grzelak, 1979). The process also contributes to psychological resilience by enabling individuals to reframe experiences and gain social validation (Harvey & Boynton, 2021).

Self-disclosure occurs across various contexts, including interpersonal relationships such as friendships, romantic partnerships, family, and professional settings (Jourard, 1971). It is influenced by factors like perceived trust, cultural norms, power dynamics, and individual personality traits such as self-esteem and openness (Collins & Miller, 1994). The quality of self-disclosure has implications for mental health and wellbeing; appropriate and supportive disclosure promotes positive adjustment (Pennebaker, 1997).

With the rise of digital communication technologies, self-disclosure has extended into online domains, leading to novel forms of interaction. Computer mediated communication provides affordances such as anonymity and reduced non-verbal cues, which can lower barriers to self-disclosure by reducing social anxiety (Joinson, 2001). However, online self-disclosure also carries long term risks related to identity theft, sexual harassment, misinterpretation, and potential criminal exploitation of shared information (Arhoni, 2016). Despite these concerns, studies indicate that online communication can enhance social support networks and foster psychological benefits when managed mindfully (Ostendorf & Brand, 2022).

Artificial Intelligence technologies have a growing effect on people's interaction and exchange of private data. While self-disclosure to AI agents such as chatbots has been thoroughly investigated, the effects of AI between human self-disclosure in interaction have received lesser amounts of research. Schuetzler et al. (2018) observed that individual self-disclose more to conversational AI agents rather than the conversational agent that is human supervised due to social desirability. This idea is also supported by Papneja & Yadav (2024) which says that people have low fear of self-disclosure to a Conversational AI than to human because the AI does not have ability to judge, and there is anonymity involved moreover, people have less trust in human than to an AI, machines regarding their information. This shows that people disclose more to an AI. If there is more reliance on CAI than self-disclosure to other people, there will be less.

Apart from that, the population is affected by the AI algorithm employed in social media and communication apps which effects individual relationships with another. (Jawad et al., 2024). These systems curate and shape the personal information shared, which is affected by privacy and trust among users (Joinson et al., 2010). Thus, AI can provide just a hint of facade of intimacy unlike human interactions build on trust, which is a kind of illusion that can make people disclose more to it than the human (Jiang, 2024)

1.3. Social Connectedness:

According to Lee & Robbins (1995), social connectedness is a person's idea of how his relationship is with another person; it can involve perception of relationships with friends or society. It involves emotional relations and connectedness. Social connectedness is associated with subjective happiness and increases well-being of an individual but is negatively associated with loneliness (Satici et al., 2016) and loneliness is related to social isolation (Lunstad et al., 2015). When there is regular interaction with other people, and individual feels that he is welcomed, respected, and included in that place, then it's easy for them to meet basic human needs that helps in increasing emotional and psychological wellbeing of a person (Baumeister & Leary, 1995). Strong social bonds provide comfort, an emotional one especially, and a sense of security with active help that powers the person and communities (Oyanedel & Páez, 2021). On the contrary side, weak or light social bonds can be linked to higher threats of depression, anxiety, and can lead to dangerous probable, early demise of a person (Holt-Lunstad et al., 2015).

Past the focus on individual social bonds, social connectedness also focuses on a person's sense of belonging within one's society or community and how he is involved in broader social relations. This sense of belongingness is based on shared understanding of person with others, trust and emotional connectivity among individuals in community, this all increases the strength of social or interpersonal bonds and bonds the groups (Delgado & Fareri, 2023; Morelli, 2004). As a versatile detailed element, social connectedness includes both structural elements and functional elements like participation in social relations and person's perceived social backing and emotional closeness with others (Miyamoto et al., 2024). These type of strong social relationships and connectivity helps buffer various psychological and social issues like for people having severe economic issues or social rejection, (Bauer et al., 2025).

Due to advancement of social media and digital communication, people way of forming and then contributing or maintaining a relation has changed, it either increases one's connectivity but usually causes issues for traditional way of engagement (Gazi et al., 2024). Artificial Intelligence tools like chatbots and virtual companions are now being used to reduce loneliness and help people interact more, especially those who are isolated, such as older adults (Yang et al., 2025). As AI can imitate the conversations sounding like human, this can make people feel closer or connected as it can provide emotional or social support which can in return improve mental wellbeing of an individual (Merrill et al., 2025). Over relying on it can cause disruption in social connectedness. For AI relationships to truly help, the systems need to understand users' emotional and social needs (Reddy & Kumar, 2025). People turn to these AI chatbots if they perceive less

social support or have high use of AI as to get a feel of companionship (Zhang et al., 2025).

Social connectedness also plays a huge role in the educational sector by focusing on students' wellbeing. When students feel socially connected to home, peers, or their school community, they tend to experience better overall wellbeing, like looking forward to going to school, caring about teachers' perception about them, focuses on their study and feel less loneliness. On the flip side, when that sense of connection is missing or weakened, students are more prone to depression, social anxiety, social bullying, and may abuse substances which is not very healthy (Chuter, 2020).

Strong social encouragement from relatives, close companions and larger circles can act as effective shield against stress and psychological issues and this pattern is especially noticeable among Pakistani university students. for instance, research finding shows that a mix of presumed support from others and individuals resiliency indicates improved emotional and psychological wellness (Asghar,2025), aiding students in better handling of daily challenges and academic strain. Even in the context of social media addiction, which can fuel issues like aggression, Pakistani young adults including students with solid social ties fare better, as their connections help moderate these negative effects and keep harmful behaviors, means social connectedness moderates social media addiction and aggression (Shahid et al.,2024).

1.4. CAI and Students:

Students are influenced primarily not academically but additionally more deeply on emotional and social level by Conversational AI (chatbots and electronic companions). Though outcomes fluctuate among research and scenarios, the latest meta-analyses in academia demonstrate that chatbots have low to medium beneficial impact on academia result and pupil achievements (Laun & Wolff, 2025).

Many students establish profound, often strong feelings with conversational agents on interpersonal levels. Based on research, individuals often anthropomorphize conversational AI, portraying them as caring, open-minded listeners, and affective outlets. This ability can result to parasocial or bonded interactions between pupils and chatbots (Darling, 2024). Investigation of young adult utilization psychological chatbots has proven that these connections may alleviate emotions of isolation and offer immediate psychological aid when assistance from people is not obtainable (Fitzpatrick et al 2017).

Nonetheless, there are societal threats associated with emotional reliance on AI. Pupils' relation with others and reliance on friends and instructors for interpersonal as well as educational cooperation can be degraded through overuse of companion chatbots that may substitute conversation with humans (Al-Zahrani, 2025). Furthermore, research suggests that pupils who believe AI extremely may believe inaccurate data without scrutinizing even if psychologically compelling AI answers may sometimes contain faults or lack psychological depth (Al Maskari et al. 2025). Controlled feasibility research like Woebot, conversational bots may encourage human psychological wellbeing through

offering psychoeducation, feedback and CBT like therapy that lessens temporary feelings of sadness and stress in students demonstrate significant participation and temporary changes in mood (Fitzpatrick et al. 2017). Still thorough evaluation shows inconsistent long-term consequences and encourages warning: advantages are present, but they are not common and are dependent on user preferences, layout and setting (AL Maskari et al. 2025).

In order to keep up intellectual ability and interpersonal competencies, institutions might respond responsibly and professionally through encouraging appropriate limits artificial intelligence and human relationships defining clear standards usage in educational setting and educating about AI like how AI operates and its drawbacks (Fearn, 2024). The availability and immediate responsiveness can be utilized while ensuring pupil social development and educational excellence through careful adoption, where AI supports rather than substituting interaction with people (Guingrich and Graziano, 2023).

The aim of this research is to focus on social connections of students affected by conversational AI dependency and how this CAI can affect self-disclosure to other people and impacts students' interaction with other individuals.

Chapter 2

Literature Review:

The research by Christoforakas et al. (2021) with the title “Connect with Me: Exploring Influencing Factors in Human- Technology Relationship Based on Regular Chatbot use" investigated how often engagement with a conversational AI chatbot impact consumers feeling of social connectedness in relation to machine. With the goal of tracking psychological alterations throughout the study period, they used a two-week intervention with 58 participants who communicated with the chatbot and answered daily or weekly assessment. The result suggested that the duration and intensity of engagement were positively correlated with social connectedness to chatbot. The individual's feeling of connectedness grew deeper depending on how frequently they spoke with bots. The research also discovered that anthropomorphism and social presence were two important mediating variables that assisted the understanding of this association. The individual's perception to perceive the bots as more human as when it showed greater degree of human traits such as friendliness, persona indications or conversational engagement. Also, consumer feelings of attachment increased by bots' social presence. All these variables greatly facilitated the development of social connectivity.

The paper “Can ChatGPT Be Addictive? A Call to Examine the Shift from Support to Dependance in AI Conversational Large Language Models” by Yankouskaya et al. (2024) explores the way ChatGPT specifically users to steadily shift from appropriate interaction to emotional reliance. The authors claim that traits like extremely specific

replies, psychological assistance and 24-hour accessibility can foster false social association, offering individual feeling of empathy and emotional backing that is similar when interacting with another human. The study cautions that severe or prolonged reliance on ChatGPT might reduce individuals autonomous thinking, weaken ability to solve problems, encouraging avoidance of practical coping strategies, despite the reality that ChatGPT delivers immediate advantages such as instant assistance, place for emotional venting and academic guidance. This excessive relying may reveal severe utilization practices in which continuously depend on AI for reassurance and opinions even when it compromises interaction with other, routine duties and educational responsibilities. The author emphasizes the value of maintaining reasonable boundaries while interacting with conversational AI and suggests digging deeper to the point at which backing turns into dependence because these tendencies match initial signs of behavioral addictions.

239 Americans individuals who were unfamiliar with Conversational AI took part in Wu (2025) research "Trust, Anxious Attachment and Conversational AI Adoption Intention in Digital Counselling: A Preliminary Cross-sectional Questionnaire Study". After evaluating individuals' styles of attachment, they were presented with vignette for reading on utilization of CAI to assess their emotional trust in AI and their plan to use it. The findings revealed that dispositional trust in AI key indicator for plan to adopt AI ($p<0.001$) whereas avoidant style ($p=0.09$) was not predictive of people readiness to embrace CAI therapy although attachment anxiety ($p=0.04$) did. The findings showed that with high dispositional confidence in AI and attachment anxiety were willing to undergo CAI counselling for psychological problems.

Giray (2024) used a qualitative narrative-based inquiry in his research “Conceptualizing AI Addiction: Self- Reported Cases of Addiction to an AI Chatbot” to investigate people self-reported instances of developing a dependency to AI a chatbot particularly Character AI. A trend of frequent and persistent usage that starts to cause problems with persons' routine activities and overall wellness is what Giray defines as AI addiction. Based on reports examined this new type of technological dependence is highlighted by variety of significant traits such as obsessive participation, an intense sense of connection to chatbot and neglect of responsibilities in reality such as social interactions, academic classes and caring for oneself. Additionally, individuals stated they spent a great deal of time engaging with AI frequently at the cost of personal interest, work, and restful sleep. The study emphasizes psychological losses such as mood swings, enhanced stress, sense of disconnectedness from reality brought on by extensive engagement in AI facilitated communications as well as mental decline such as decreased originality and ambition to think critically. Particularly, some individuals claimed when they chose to reduce their usage or stop dealing with it, they experience signs of withdrawal or feeling of returning to interacting with CAI which are identical to trend found in substance use disorders. These narratives emphasize the severity of AI dependency as a developing behavioral issue and its possible impact on psychological wellbeing.

To determine how several AI chatbots channels and communication styles affects individuals psychological and social behaviors such as such as feeling alone, social engagement and reliance, Fang et al. (2025) carried out huge 4 week randomized controlled experiment titled “How AI And Human Behaviors Shape Psychosocial Effects Of Chatbot Use: A Longitudinal Randomized Control Study”. All the 981 participants in

the research project communicated about 3000 responses to chatbots with multiple forms of communication (text or neutral voice) and types of communication (personal, non-personal, and open ended). The findings showed complicated effects; private conversation raised isolation but also lowered psychological reliance on the AI; voice based chatbots at first decreased sense of isolation but later eliminated this advantage; non personal communication minimized feeling of isolation but promoted dependence on the bot. Furthermore, the research demonstrated that while conversation with chatbot can provide immediate psychological and social comfort, overly and improper involvement can aggravate loneliness and reliance on AI facilitated conversations. It also concluded that greater utilization of AI chatbots may end up elevating feelings of isolation, psychological reliance, risky use of AI, and reduce offline interactions with others. The results highlighted the significance of closely tracking usage of chatbot trends to evaluate their capacities for assistance over the risk of mental impact.

Higher education utilization of technology fluctuates constantly and the introduction of recent generative artificial intelligence (Gen AI) specifically chatbots with AI features offers advantages as well as challenges for educational institutions for educating and learning. Following in depth evaluation of 37 papers guided by concept of activities, this paper investigates the who, why and how of AI driven chatbots adoption in higher education to address the new environment. The study titled “The who, why and how of AI chatbot learning and teaching in higher education: A Systematic review” by MA et al. (2024) investigated undergraduate students are among the frequent users of chatbot for reasons of learning based on published research. These pupils often utilize chatbots to strengthen their drive, gain wisdom, build their competencies, and abilities of reasoning

or analytics. Based on the review, the demand for secure settings of learning, interpersonal modeling, and individualized experiences of learning are among the primary reasons for usage of AI. When it comes to setting up, just one or external single modal chatbots are often employed for conversational rehearsal, literary help, and educational assistance. They are regularly employed away from conventional education environments complementing online education and independent learning. The results reveal generally positive effects on students leaning, motivation, memory retention and attitudes when tactics like adding games elements and multiple modal combination are used to boost learning but varying of results shows the demand for more research.

“The Impact of Artificial Intelligence Chatbots on Higher Education Learning and Teaching: A Systematic Literature Review” by Molter et al. (2025) is an in-depth literature study that focuses on the possible effects usage of AI chatbots for educational purposes as well as the ways they are being introduced into educational institutions. Based on examination of 29 peer reviewed articles published between 2020 and 2024 and published in Clarivate’s web of science, the investigation emphasizes university students and teacher's primary demographic communicating with AI chatbots. By highlighting four major concepts like adoption and acceptability factors, pupil's views and encounters, ethical concerns, and academic activities and results, these investigate the reason for using chatbot and their effect on learning. Amid worries about hallucinated outcomes and excessive dependency, students view chatbots as advantageous due to their broad accessibility and immediate responses. The results indicate that effective implementation is greatly affected by simple use, context usefulness, and the support of the institution. Also, ethical concerns about limiting interaction with others, security of data, and

educational honesty were noted. Also, the necessity of unambiguous institution rules, sufficient instruction, and evaluation mechanisms that boost fair and appropriate AI use.

The study “All Roads Lead to Chatgpt: How Generative AI is Eroding Social Interactions and Students Learning Communities” by Hou et al. (2025) explores the ways students' interpersonal relations along with educational habits are altering due to generative AI growing popularity in higher education. The study is centered on undergraduate computer science students including 17 semi structured interviews from seven R1 universities in North to gather comprehensive details on students interpersonal as well as educational experiences.th research investigates reasons why have begun to include generative AI into their ways of seeking assistance especially in peer-learning and group environments. Results reveal that as opposed to offering immediate assistance, pupils commonly send peer inquires to generative AI which lessens joint learning and decreases peer relationship building. As typical interpersonal support groups and educational networks gradually diminish, individuals additionally complained by rising feeling of loneliness. And sadness. In conclusion, the findings show adverse effects for educational environments interactions among peers, and students' sense of communal interactions, demonstrating the reality that despite generative AI might promote individual development and its broad use may may deliberately compromise interpersonal relationships that are needed for productive educational experience and general well-being of pupils.

The study titled “Exploring the Impact of Artificial Intelligence Chatbots on Human Connection and Emotional Support Among Higher Education System” by Al- Zahrani

(2025) evaluates how students' opinions interpersonal interaction and psychological support in educational context are impacted by the increasing availability of artificial intelligence chatbots. The study is a quantitative assessment of how learners react using instructional chatbots with emphasis on higher education pupils and information from an extensive population of 819 individuals. The investigation used a method of quantitative research and survey administered through the internet to measure how pleased learners were with usage of chatbot exchanges, their experiences with it, and anxieties about losing their relationship with humans. The results demonstrated that although pupils agreed advantages of AI chatbots including individualized assistance, easier availability of data, and improved chances of educational learning they also raised grave worries regarding loss of connection with individuals and psychologically emotional support as they utilized bots. Pupils fear about losing interaction with humans had strong association with chatbot engagements and contentment with its usage, based on regression analysis implying that rising usage of bots may worsen feeling of emotional alienation. In conclusion, the research shows the necessity for thoughtful approach of chatbot adoption including rules of ethics, training of teachers and pupils and bot models that put human interaction and psychological assistance above mere information provision.

The study titled “My Name Is Alexa- What Is Your Name? The Impact of Reciprocal Disclosure on Post Interaction Trust in Conversational Agent” by Saffaizadeh et al. (2023) addresses the way conversational AI reciprocal self-disclosure impacts the confidence or trust of users after the interaction with AI. The study explores how similar behaviors in communication like humans promote the growth of trust by targeting mature users, communicating via both audio and text intensive communicational AI. To facilitate

the users' sharing, investigation used a design that was experimental to see what happens whether communicational bots revealed little private and like human knowledge. The results suggest that communicational agents who engaged in reciprocal self-disclosure were considered as to be more anthropomorphic and that resulted in impressive rise in affect-based trust (emotional trust and sincerity) and cognition-based trust (belief in individuals' abilities and accuracy). In conclusion, the research findings signal that reciprocal sharing strengthens individual opinion about conversational AI traits like human increasing their emotional and cognitive trust and stressing the importance of interpersonal interactions cues on following the interaction confidence within Artificial intelligence machines.

Trends of digital disinhibition and self-disclosure in digital networking platforms are investigated in research of “Investigating Reddit Self-Disclosure and Confession in Relation to Connectedness, Social Support, and Life Satisfaction” (Miller, 2020). 628 reddit members engaged in the research which analyzed the connection among psychological consequences. Along with behaviors like rate of sharing, consuming confession remarks, duration spent on internet or social network sites and personality characteristics like narcissism and sensation seeking. The research evaluated interaction with others, a sense of support from others, fulfilment in life, and using quantitative questionnaires. The analysis demonstrated that disclosure of oneself had a positive relationship with greater degree of sensation seeking and narcissism, also social connectivity, support from others and satisfaction in life. On the other hand, continuous uploading of confessional material appeared to have high narcissism and less closeness with others and more feeling of isolation. Furthermore, spending time on the internet has

been associated with more confidential kinds of disclosure of oneself rather than wellbeing outcomes. Overall, the research stresses upon complicated nature of disclosure of self on online, noting that obsessive or confessional blogging promotes loneliness though sharing private information may increase emotions of connection and acceptance.

The quantitative research titled “Relationship Between Artificial Intelligence and Students Learning Strategies at Secondary Level” by Kausar et al.2024 analyzes the way AI usage impacts high school pupils' methods of learning in Sheikhupura, Pakistan within government and privately owned schools. The investigation used a questionnaire-based method of research with representative samples of 600 secondary level students to investigate the link between consumption of AI tools and various methods of learning, particularly collaborative learning. Based on results, AI applications assist pupils through offering immediate feedback facilitating individualized learning boosting team-based learning which improves group interaction. But the report additionally points out issues that might hinder these advantages like decreased interaction with other human and inequitable availability of AI instruments. Usage of AI and shared learning were found to be moderately positively associated by statistical analysis revealing that although AI may promote or improve teamwork, it is unable to substitute the element of human interaction that is needed for effective education. In conclusion, to enhance academic accomplishments guarantee adequate learning interactions, the research stresses the value of maintaining an equitable mix of AI and interaction between humans.

The quantitative study titled “AI Assistant Is My New Best Friend ! Role Of Emotional Disclosure, Performance Expectations and Intention to Use” by Affandi et al. (2025)

looks at the way the individual's perception of perks of AI agents affects their plan to use them in Pakistani society. To investigate connections between AI agent advantages, consumer involvement, psychological disclosure, competence desire, reuse plan, the research indicates individuals' attitudes towards advantages of AI agents notably improved consumer involvement, psychological disclosure of oneself both served as mediating variables that boosted consumers desire to stick with AI agents. Furthermore, the collective impact of user involvement and psychological disclosure on reuse desire was boosted by performance expectations which worked as moderating factors. In conclusion, the findings describe optimizing prolonged use of AI agents that relies heavily on a mix of psychological and performance-related aspects. The research suggests that developing AI agents that nurture personal relationships and fulfill requirements for efficiency may positively impact future retention among user and commercial goals. This has real world impact for administrators and marketers.

The theoretical analysis “Artificial Companions, Real connection? Examining AI ‘s role in social connection” by Savic, (2024) explores the increasing usage of AI as social companion and raise concern regarding these gadgets can give genuine attention in the light of increasing of feeling of isolation and dwindling interpersonal relationship. The paper makes an argument utilizing the Ethics of Care structure, that although AI associates provide artificial psychological assistance, objective engagement and continual accessibility they do not possess the real reciprocity, compassion and ethical duty constitute relationship between people. Using Replika as an instance the analysis raises focus to ethical issues like psychological reliance, the exploitation of support, psychological reduction in skills and likelihood that AI communications would replace

interpersonal connections rather than enhancing them. The analysis tells that while AI companions may assist vulnerable people, momentarily ease loneliness, their robotic character hinders them from giving genuine social connections. The conclusion is that to ensure safeness of psychological wellbeing and maintain the basic human aspects of care and interpersonal relationship with other, clear structure, ethical laws and introduction of AI as helpful device rather than a replacement for relationship with other humans, are crucial.

The title of the research, “Who Will Turn to Chatbots for Emotional Disclosure? Exploring Conversation with Chatbots, Self-compassion And Existential Meaninglessness in American Hong Kong Adolescents” by Xie (2025) involves the tendency of teenagers for affective disclosure of oneself to chatbots and its connection to existential meaninglessness and empathy for oneself is explored in this quantitative multicultural study. The research, which used questionnaires from 2272 teenagers in Hong Kong and United States with an average of 15.5 years, showed more disclosure of oneself to chatbots had negative correlation with existential meaninglessness and had positive relation to greater amount of self-compassion. Gender and ethnic setting nonetheless moderated these associations; these associations demonstrating that teens' motives for disclosing information to chatbot fluctuate among social and cultural groups. In addition, the study further demonstrated teenagers who solely utilize chatbots to share their emotion may have greater level of feeling of purposeless life, indicating significant mental health risk associated with replacing human ties with virtual ones. In conclusion, the research recommends more investigation into how AI mediated disclosure promotes

satisfaction across psychological and cultural settings and emphasizing possible problematic and helpful role chatbots play in teenage lives.

A chapter “Conversational AI For Students Well Being: Transforming Mental Health Support in Education” by Aziz et al., (2025) from the book “Enhancing Student Support and Learning Through Conversational AI” involves using factual data and real-world examples, to investigate the way conversational AI aids student's mental health in academic settings. It stresses how chatbots equipped with artificial intelligence could deliver immediate, affordable and readily available mental health support especially in conditions where psychological facilities are overworked. It also shows their capability to decrease anxiety, boost mental toughness, and contribute to general wellbeing for pupils. By dealing with moral problems including confidentiality of information, algorithmic prejudice, psychological detachment and AI’s shortcomings in giving practical care involving growing dependency on AI. The chapter illustrates the value of human-AI cooperation that puts compassion, justice, and responsibility first through case studies and governance issues. Instead of substituting human relationships with another, there should be careful adoption of conversational AI.

2.1 Theoretical framework:

2.1.1. Social penetration theory:

Social penetration theory by Altman and Taylor (1973) Explains how the relationship Gradually develops as self-disclosure increases in it add first in relationship. Thus, self-disclosure starts at surface level like one's hobbies and then moves to a deeper level, like sharing fears and secrets as intimacy and trust grows between them. Disclosure is

reciprocal and systematic and moves along two dimensions such as breadth (types of topics that are shared between each other) and depth (the level of intimacy within the topics shared). This shows that self-disclosure is important in maintaining human relationships. The depth and reciprocity noted in social penetration theory might be affected when students utilize AI chatbots rather than friends, relatives, or teachers for disclosing oneself. Chatbots do not possess true psychological reciprocity, but they can replicate interest and can give nonbiased feedback. If students continually satisfy their emotional need and may engage in disclosing about oneself to AI for prolonged use may make students less confident and hesitant to share private information with actual individuals, which can weaken interpersonal connection and sense of belongingness. Therefore, by demonstrating the way AI dependency can affect students' disclosure about oneself and perhaps hinder the growth of reciprocal relationship between human, which is important for psychological health and socialization, this study expands social penetration theory to technological setting.

2.1.2 Displacement theory:

According to displacement effect theory by Neuman (1988), investing time and energy to one task could decrease time and motivation for additional hobbies or interaction with others. This notion has been utilized in multiple studies that demonstrate how individuals' offline interactions have been substituted by digital interactions. When applied to pupil, the displacement theory explains the way too much dependency on conversational AI chatbots for psychological or educational assistance may end up interacting less with friends, family or teachers. Although chatbots give comfort, individual guidance, and

psychological assistance, they also possess the ability to substitute for sincere interaction with people. Such displacement may leave people feel less socially connected, decreasing their relationship with others and reducing their chances for growing compassion and confidence. Psychologically, it can cause students to feel more isolated as they do reciprocal disclosure of oneself with an AI instead of relationship with other humans to fulfill their psychological needs. In Pakistani context, where social connection is prioritized, this displacement can negatively impact pupils' growth in society and connectedness with others, stressing the urgency to balance AI use with it.

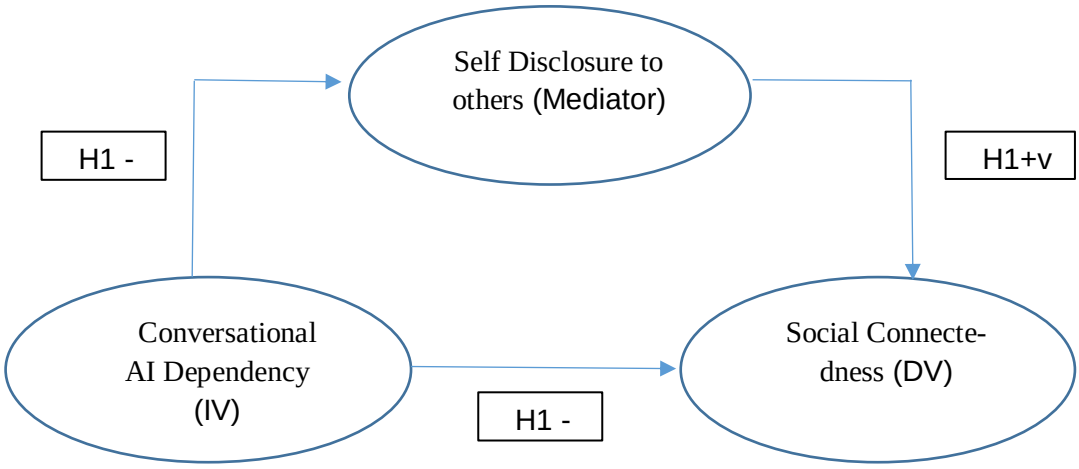
2.1.3. Media Richness Theory:

Based on media richness theory by Richard & Robert (1984) that incorporated the capacity to give immediate feedback, relay psychological and interpersonal signals, and offer personalization affects the level of quality and efficacy of communication. Conversational AI is lean medium while face to face interaction is rich medium providing elaborated and diverse communication. Students are mainly interacting with low-richness communication when they are frequently dependent on AI chatbot for solving their queries, affective openness, or educational help. This may eventually leave students feel less comfortable having deeper, risky or psychologically complicated exchanges with classmates or teachers, which may decrease their readiness to get involved in revealing their private information in real world environment and hinder the building of profound social ties.

2.1.4. Compensatory Internet Use Theory:

Compensatory internet use theory by Winther (2014) examines the way individuals adopt internet technologies to deal with pressure or anxious feelings to fulfil the unmet psychological or emotional requirements. AI chatbot could be easily accessible tools for pupils in dire need of educational assistance, psychological guidance or comfort. Overuse of it, however, may unintentionally dimmish genuine interaction with others, encouraging social isolation, rejection of relationship with others, dependency on AI for healing. The development of interpersonal competencies, understanding, and mental toughness may be hindered by displacement of real interaction with another human.

2.1.5. Conceptual Model:



2.2. Problem statement:

Since students in Pakistan are utilizing conversational artificial intelligence (CAI) like ChatGPT and other chatbots so swiftly almost the research that has been published until

now is on educational advantages of these programs, which involve enhanced academic performance, handling of task, and deeper comprehension of challenging ideas. The social effects of students due to dependency of CAI are not well understood, also the long-term use of CAI for tackling issues and affective disclosing of oneself may change pupils' self-disclosure habits, decreasing in person social connectedness. Even though AI can be effective and give individualized assistance, students who lean too much on it can become detached from their emotions, have less compassion, and avoid interacting with peers and family. This gap stresses the neccessity to investigate how student social life is impacted by reliance on conversational AI, especially in the Pakistani environment where close connection to society and relationship with others are highly valued.

2.3. Research objectives:

- To explore the association between conversational artificial intelligence, self-disclosure to others, and social connectedness.
- To investigate the prediction of conversational AI dependency, self-disclosure to others, and social connectedness among university students.
- To investigate whether self-disclosure to other people mediates the relationship between conversational AI dependency and social connectedness among university students.
- To assess the influence of demographics like gender, frequency of using CAI, level of study, and subject area on conversational AI dependency among university students.

2.4. Hypothesis:

1. There is likely to be a statistically significant relationship between Conversational AI dependency, self-disclosure, and social connectedness among university students.
2. Conversational AI dependency is likely to predict the relation with self-disclosure to other and social connectedness among university students.
3. Self-disclosure to other people mediates the relationship between conversational AI dependency and social connectedness among university students.
4. Demographics like gender, frequency of using CAI, and program of study are likely to influence conversational AI dependency among university students.

2.5. Significance:

The study is important because it examines psychological and social effects of usage of conversational AI by Pakistani university students which are often neglected. While prior research investigations have largely centered the way AI tools strengthen or weaken pupils performance academically, involvement and assignment handling as well as issues like weakened analytical thinking, they have dedicated very little regard to how self-disclosure, and social connectedness maybe affected by extended use or reliance on conversational AI. The present study provides an expanded perspective of AI's influence on people's everyday lives by concentrating on interpersonal and psychological interactions rather than merely educational impacts. Moreover, in Pakistani settings, where interaction among humans and social support networks are crucial, this study is significant to look at students' wellbeing or connectedness due to conversational AI

chatbots. The research emphasized whether the use of conversational AI boost perhaps alternate human connection, with consequences for students' sense of connection with others and mental wellbeing by offering specific insights that are lacking from western dominated work. It lays groundwork for further research related to appropriate balance between technological growth and connection with others while focusing on AI impacts on self-disclosure to other people.

2.6. Rationale:

The present study focuses on pupils, a population that is growing increasingly dependent on conversational AI technologies like ChatGPT for regular assistance, solving problems, and educational help. Students' reliance on conversational AI chatbots is rising tremendously over time continually using it to finish tasks, grasp understanding of complex topics, and even get psychological aid. The likely interpersonal and societal effects of dependency on chatbots have gotten considerably fewer recognition, despite the reality lithat an enormous amount of material now in publication focuses on the educational advantages of AI among university students. In addition to stressing the value of self-disclosure to others in encouraging beneficial interaction with others, the research investigates the way over reliance on chatbot may lead to social and interpersonal complications. Also, current research has focused on how pupils share to the AI system rather than the way conversational AI reliance may impact pupils' capacity or need to share information about themselves with others. As decreased disclosure of self could undermine interpersonal ties and psychological assistance system, this variation proves particularly vital. The research gives important information for educational

organizations, lawmakers, and psychological experts to gain an understanding of potential negative effects of usage of AI while also embracing its educational advantages. By investigating interpersonal and psychological dangers of conversational AI dependency, this research fills important gap in Pakistani context, where the study has mainly focused on benefits and negative educational consequences of AI for university students. This encourages more human focused and equitable methods to AI usage for more educational benefits of students.

Chapter 3

Research Methodology:

The aim of this study is to investigate the relationship of conversational AI with social connectedness of Pakistani students. It also focuses on taking self-disclosure as a mediating factor between the two. It was done to see how conversational AI dependency can affect self-disclosure to other people and social connectedness among students. This methodology section covered research design, population, sampling, data collection procedures, data analysis methods, and research ethics.

3.1. Research Design:

For this study, the quantitative, cross sectional survey design was used to predict the impact of the conversational AI on social connectedness among students with self-disclosure as the mediation between them. A survey method is utilized to gather data from university students. The survey method includes validated instruments to assess the conversational artificial intelligence dependency (CAID-20), self-disclosure (Self disclosure of self), and social connectedness (Social Connectedness Scale-revised). The data compromises of universities students aged 17-28 years. Data collection was over 1.5 months, which ensures sufficient time to collect representative data.

3.2. Population and Sampling:

The sample of study is 300 University students in Lahore, Pakistan because university students are more inclined to use of artificial intelligence then secondary ones. Participants are selected using the purposive sampling technique. Participants are taken within age range of 17-28 years and only those who have any prior experience with chatbots and does not have any disability or clinically diagnosed psychiatric disorder as their conversational artificial intelligence would be different than other students. The data was collected from various public and private universities in Lahore. Before administration, informed consent was taken. All necessary demographic variables were taken for study.

3.2.1. Inclusion criteria:

- Participants must be currently enrolled in any university in Lahore doing either undergraduation or post-graduation.
- Participants must be 17 years or above but below or equal to 28 years.
- Students who could understand English enough to complete the survey.
- University students who use conversational artificial intelligence.

3.2.2. Exclusion Criteria:

- Students diagnosed with psychological disorders like severe depression, anxiety disorders, or any other psychological issue.
- Individual who did not consent to study in survey.

3.3. Data Collection:

Data for study was gathered through questionnaires with Likert scale through purposive sampling by selecting university students who use conversational AI chatbots and did not have physical or psychological issues, in Lahore.

3.3.1. Informed Consent:

Written Permissions was taken from the participants, and they were informed about the purpose of the study through an informed consent form. Before data collection, it was given to every participant in which they are asked about their consent to participate in this survey, and this form outlines the aim of study and a guarantee of keeping their information confidential. They are asked to sign compulsorily before taking the survey.

3.3.2. Demographic form:

It was developed to get personal information from the participants to understand different aspects of conversational AI use. It includes information regarding age, gender, subject area, level of study, and conversational artificial intelligence for frequent use.

3.4. Assessment measures:

3.4.1. Conversational AI Dependency:

Conversational AI dependency scale is developed and validated by (Chen et al.,2025) which can be used to measure conversational AI dependency in an individual, it was done on Chinese college students. This scale is constructed through item generation, exploratory factor analysis, and then confirmatory factor analysis with strong reliability (Cronbach alpha= 0.96) and validity. The CAID-20 consists of 20 items that are made on

four dimensions, such as uncontrollability, withdrawal symptoms, mood modification, and negative impacts. From various studies it is found that higher CAI dependency is linked to lower subjective well-being and negative psychological outcomes while there is significant difference in age, gender, grade, and income. It includes items such as “CAI has become indispensable part of my life”

3.4.2. Self-Disclosure to other people:

Self-disclosure of self-scale is made by Collins (2024) in research titled “How others affect Identity: The Roles of Mere Presence, Self Disclosure Extent and Partner's Responsiveness". The scale made in it can be used to measure self-disclosure. It is of 5 items made of framework of Omarzu’s work that describes the important component of disclosure like depth, breadth, duration, authenticity and importance. The 5 items measure the extent one tells personal information of self to others. such as “I revealed a lot of information about myself” and “I discussed things that revealed my authentic self "which can measure whether a person self discloses to another person and how much does they do it. Responses are measured on a 9-point Likert scale (1=strongly disagree to 9=strongly agree). The reliability of scale is strong (Cronbach alpha=0.96).

3.4.3. Social Connectedness:

For Social connectedness, social connected scale- revised by Lee et al. (2001) that is adapted by using an original Social connected scale (Lee & Robbin, 2001). The revised scale captures both positive and negative parts of social connectedness, which means feeling a sense of belongingness. There are 20 items in it, the responses are recorded on Likert scale point, 1=strongly disagree to point6= strongly agree, so like on 6-point scale.

There are 10 positive worded items and 10 negative worded items (reversed items). The higher scores mean higher social connectedness and on college students, the scale has good internal consistency which is Cronbach alpha=0.92.

3.5. Procedure:

A survey was conducted by meeting each student from different departments in different universities in Lahore. Where explained to them the purpose of the study and then if they were willing to participate, then informed consent was given to them. After they signed the consent form, they were given the questionnaire. Moreover, the right to withdraw from study anytime was also explained so that there was no pressure on them in any way. Any concern in understanding the questionnaire was addressed by the researcher. They were requested to complete it thoroughly and truthfully. At the end, when they were done, the questionnaire was taken from them, and they were thanked for completing the questionnaire.

3.6. Data Analysis:

Data was analyzed using the Statistical Package for Social Sciences (SPSS) software. Descriptive statistics were used to summarize the demographic information of the sample. For the first hypothesis, correlation analysis was used to see association between conversational AI dependency, self-disclosure to others and social connectedness, meaning to see whether high conversational AI dependency has any relationship with self-disclosure and social connectedness. Regression analysis was used for the second

hypothesis, in which conversational AI dependency predicts self-disclosure whether high Conversational AI dependency significantly lowers self-disclosure to other people. For a similar hypothesis, conversational AI dependency was taken as predictor for the outcome of social connectedness as regression analysis. For third hypothesis, a Process macro by Andrew Hayes was help determine mediation. For the last hypothesis, to see the effect of frequency of use of conversational AI dependency, then one-way Anova analysis was done to see frequency of use affects CAI dependency. To see about gender simple independent t test was be used for comparison between male and female students. Then, to see the influence of CAI dependency among students' subject areas, ANOVA was used. And at last, an independent t test was used to compare students study level like comparison between under graduation and postgraduation in having conversational AI dependency.

3.7. Ethical Considerations:

- Permission of scales were taken from the respected author of scales
- Informed consent was taken from each participant
- Confidentiality of each participant was made
- The information of each participant was only used for research purposes.
- Every participant was informed and given the right to withdraw from research at any point of time.

Chapter 4

RESULTS:

The purpose of this study is how conversational AI dependency affects self disclosure and social connectedness in university students. The data analysis was done using SPSS V25. Demographic characteristics table are made showing frequencies and percentages. Then Cronbach Alpha and descriptive statistics were used to verify the psychometric validity and reliability of scales. The Pearson correaltion was done to see association between variables and then regression analyses was done to identify the predictive value of conversational artificial intelligence dependency on self disclosure to others and social connectedness. Then anova and independent sample t test was used to assess demographics to see if they are significant.

Table 4.1

Descriptive statistics of demographic characteristics of samples.

Demographics Profile (N=300)

Respondent's Characteristics		***f (%)***	***M (SD)***
Age	17- 28 years		20.96 (2.482)
Level of Study	Under graduation	260 (86.7)	1.13 (0.341)
	Postgraduation	40 (13.3)	
Frequency of Usage	Several times a day	150 (50.0)	1.62 (0.695)
	Several times a week	113 (37.7)	
	Several times a month	37 (12.3)	
Purpose of use	Academic	242 (80.7)	1.19 (0.396)
	Personal	58 (19.3)	
Study Program	Stem	204 (68.0)	1.69 (1.085)
	Humanities	18 (6.0)	
	Social sciences	45 (15.0)	
	Allied Health sciences	33 (11.0)	

Institution	Public University	59 (19.7)	1.80 (0.398)
	Private University	241(80.3)	
Gender	Male	140 (46.7)	1.53 (0.500)
	Female	160 (53.3)	

F=frequency, %= percentage, M=mean, SD=standard deviation

Table 4.1 indicates that most participants were young adults (M = 20.96, SD= 2.482). The respondents were primarily undergraduate (M=1.13, SD=0.34), around 86.7%, as opposed to postgraduates (13.3%). All respondents stated they did not have any psychological or physical issues, and their mean is 2.00 and S.D is 0.006. The most common usage of CAI among respondents was several times a day (50.0%) then 37.7% several times a week and only 12.3% several times a month. This tells that students interacted with CAI on a regular basis (M=1.62, SD= 0.70). Most of the students stated they used it for academic purposes (80.7%) as opposed to personal use (19.3%) (M=1.19, SD=0.40). There seems to be significant presence from social and scientific fields regarding use of CAI, with majority students enrolled in stem subjects (68.0%) followed by social sciences (15.0%), Allied health sciences (11.0%) and Humanities (6%). Also, the majority of students were from private universities (80.3%) showing a higher percentage from private institutions (M=1.80, SD=0.40) as compared to public universities (19.7%). Women (53.3%) were slightly more than men (46.7%) showing M=1.53, SD=0.50, indicating gender distribution was kind of balanced.

Table 4.2

Psychometric Properties for Conversational AI, Self disclosure and Social connectedness Reliability Analysis (N=300) of all scales

Variables	M	SD	α	Range		Skew	Kurto
				Potential	Actual		

Conversational-AI Dependency	58.88	18.93	0.917	20-120	20_120	0.27	0.209
Self Disclosure of Self	17.21	3.870	0.70	5-45	7-26	-0.57	-0.55
Social Connectedness	67.49	10.60	0.775	20-120	39-94	-0.19	-0.41

α = Cronbach's alpha; Skew = Skewness; Kurto = Kurtosis

Table 4.2 indicates psychometric properties of scales; all three scales showed acceptable to good reliabilities across 300 university students. With a mean of 58.88 (SD=18.93), the conversational AI dependency scale showed good reliability (α = 0.917) and covered all potential and actual range (20-120. Scores are grouped around the mean with a few extreme values that can be seen by low kurtosis (0.209) and slight positive skewness of 0.27. The self-disclosure of self-scale showed acceptable reliability of 0.70 and the mean of 17.21 and SD 3.87 and the actual range of 7-26 indicating low to moderate self-disclosure. Moreover, due to dispersed scores and high variability shown by students in self-disclosure, there is a negative skewness of –0.57 and kurtosis of –0.55. The social connectedness scale has good reliability of 0.775 with mean scores 67.49 (SD=10.60), showing moderate level of connection and the actual scores range from 39-94 and potential range of 20-120. The kurtosis score is –0.408 implying somewhat flat distribution indicating moderate variability and no extreme outliers. These descriptive indicate adequate variability and near normal distribution.

Table 4.3

Correlation Analysis of Conversational AI Dependency, Self-disclosure and Social Connectedness (N= 300)

Variables	M	SD	CAID	SD	SC
Conversational-AI Dependency	58.88	18.93	-	.416**	-.297**
Self-Disclosure	17.21	3.870		-	-.120*
Social Connectedness	67.49	10.60			-

Note: M =mean, SD= standard deviation and CAID = conversational artificial intelligence dependency, SD= self disclosure, SC= social connectedness

**p < .01

The table 4.3 shows the Pearson correlation looking at connections between conversational AI dependency, self disclosure to others and social connectedness. The results show statistically significant positive relationship between conversational AI dependency (r=0.416, p<0.01 and self-disclosure showing that people who has more reported being more dependent tended to be more self-disclosing. Moreover, there was a significant negative association between conversational AI dependency and social connectedness (r=0.297, p<0.01) indicating that lower level of social connectedness was correlated to greater dependency on conversational AI. Also, there was significant negative association between self-disclosure to others (r= -0.120, p<0.05) indicating moderate correlation between higher self disclosure and decreased social connectedness.

Overall, these findings show significant correlation across all these variables showing that conversational AI dependency is involved in both decreased social connectedness and higher self disclosure.

Table 4.4

Regression coefficients of Conversational AI dependency and Self Disclosure

Variables	**B**	***B***	**SE**	**t**
Constant	12.202		.666	18.328
Conversational AI Dependency	0.085	.416	.11	7.899
R^2	.173			

Note: B= unstandardized coefficient, B=beta and SE= standard error

a.Dependent variable: Total scores of self disclsoure

The table 4.4 displays the results of regression study concerning the predictive function of conversational AI dependency on self disclosure to others. 17.3% of variance in self disclosure was accounted for by the statistically significance shown by R^2= .173. Dependency on conversational AI was found to be a significant positive predictor of self disclosure revealing that university students who are dependent more on conversational AI also disclose more about themselves to other people. According to positive unstandardized coefficient, self disclosure rose about 0.085 units if there was rise in conversational AI dependency. These results revealed conversational AI is significant forecast to the self disclosure to other people.

Table 4.5

Regression coefficients of Conversational AI dependency and Social connectedness

Variables	**B**	***B***	**SE**	**t**
Constant	77.270		1.914	40.374
Conversational AI Dependency	-.166	-.297	.031	-5.367
R^2	.088			

Note: B= unstandardized coefficient, B=beta and SE= standard error

a.Dependent variable: Total scores of social connectedness

The table 4.5 indicates that conversational AI depndency proved to be significant predictor of social connectedness, predicting 8.8% variance in social connectedness as shown by R^2=0.088. Greater reliance of conversational AI has been correlated to lower level of social connectedness among university students as revealed by significant negative predictors like *B*= -0.297, t=-5.367, SE= .031.

Table 4.6

Mediation Analysis of conversational AI dependency, Self disclosure and social connectedness.

Path	**B**	**SE**	**t**	**p**
SD(Mediator)	-	-	-	-
CAI→ SD	0.0851	0.0108	7.899	0.000
CAI → SC (Direct Effect)	-0.1670	0.0341	-4.899	0.000
SD → SC	0.0109	0.1668	0.065	0.948
Constant (SC)	77.137	2.796	27.588	0.000
Direct Effect of CAI on SC	-0.1670	0.0341	-4.899	0.000
Indirect Effect (via SD)	0.0009	0.0146	-	-

Note. Bootstrapping based on 5000 samples. CL=95% confidence interval

Where Conversational Artificial intelligence dependency (CAI), Self disclosure (SD), Social connectedness (SC).

The path from conversational AI dependency (CAI) to self disclosure(SD) commences with SD (Mediator) and has shown coefficient of 0.0851 with standard error of 0.0108. According to this very significant relationship shown by t=7.899 and p=0.000, there is a linkage revealed like higher CAI is linked to more self disclosure among university students.

Higher CAI dependency predicts the lower social connectedness, not including self disclosure, as per the direct effect of CAI on social connectedness, which is negative and significant shown by B=-0.1670, SE= 0.0341, t=-4.899, p=0.000.

The path from self disclosure (SD) to social connectedness (SC) is not statistically significant (t=0.065, p= 0.948) with the coefficients of 0.0109 and standard error of 0.1668. this reveals that in this present study, social connectedness is not impacted by self disclosure.

With a bootstrap standard error of 0.0146 and confidence range that involves zero, the indirect effect on social connectedness via self disclosure is 0.0009. This indicates that the association between CAI and social connectedness is not significantly mediated by self disclosure.

The expected degree of social connectedness when CAI and self disclosure are zero denoted by constant for SC, which is 77.137.

In summary, the study reveals that conversational AI is a poor predictor of social connectedness. This association happens regardless of self disclosure because the mediation impact through SD is not significant.

Table 4.7

Mean comparing of frequency of usage of CAI on conversational AI dependency

Variables	Several times a day		Several times a week		Several times a month		*F*	*p*
	M	SD	M	SD	M	*SD*		
CAIDS	62.55	19.52	56.24	16.73	52.03	20.06	1.092	0.307

M= mean, SD= standard deviation, Conversational artificial intelligence dependency(CAIDS).

One way ANOVA was applied to mean computing frequency of using CAI which categorized into three groups: several times a day, several times a week, and several times a month. According to the findings, students who use CAI several times a day had the highest mean of being dependent on conversational AI (M=62.55, SD=20.06) while those who used it several times a month (M=52.03, SD=20.06). Also, the variations in the dependent across frequency of usage were not statically significant (F=1.092, p 0.307) showing that total dependency is not greatly influenced by usage frequency of CAI.

Table 4.8

Comparing means of program of study on conversational AI Dependency

Variables	Stem		Humanities		Social sciences		Allied Health		*F*	*p*
	M	SD	M	SD	M	*SD*	*M*	*SD*		
CAIDS	58.9	18.37	57.1	19.05	60.6	20.7	57.3	20.3	0.248	0.863

Conversational artificial intelligence dependency(CAIDS).

The table 4.8 shows the use of one-way ANOVA, to compute a mean of program of study which is categorized into four groups: Stem, Humanities, Social Sciences and Allied Health sciences. Having mean scores ranging from 57.11 to 60.60, the results demonstrate that conversational AI dependency was comparatively the same among study programs. The means of reliance was highest among social sciences students (M=60.60, SD=20.74) and lowest was among humanities students (M=57.11, SD=19.05). However, there were no appreciable significant changes in conversational AI dependence between educational fields.

Table 4.9

Mean comparing of gender on conversational AI dependency

Variables	Male		Female		t	Sig
	M	SD	M	SD		
CAIDS	57.88	18.330	59.93	19.442	-1.025	0.306

Conversational artificial intelligence dependency(CAIDS).

Table 4.9 shows the comparing of means of gender and conversational AI dependency. The results shows no significant differences between female and male but still female students (M= 57.88, SD=18.330) reported greater usage of conversational AI than students that are male (M= 59.93, SD=19.442).

Chapter 5

Discussion:

A sample of 300 university students took part in this present study in which the mean of age is 20.96 with standard deviation of 2.482. In contrast to postgraduate students (13.3%), the most of students were from undergraduate (86.7%). The gender distribution was balanced by taking 160 females (53.3%) and male around 140 (46.7%). Students from STEM programs (68.0%) were more followed by social sciences (15.0%), then humanities (6.0%) and last Allied health sciences (11.0%) but in dependency social sciences students come first. Also, students used CAI several times a day more (50.0%) than many times a week (37.7%) then sometimes in a month (12.3%) only. The result of this study takes on special meaning when considering university students, a demographic that often faces significant level of academic stress, emotional strain, worries about unpredictability of the future, and limited access to formal psychological support due to stigma. The findings suggest that conversational AI dependency has a negative correlation with self disclosure to actual people. Additionally, the association between Conversational AI dependency and social connectedness is not mediated by self-disclosure to other people.

Digital Platform like internet sites, or chatbots and human interaction are common coping ways used by university students to deal with stress and frustration. According to previous studies, people look for ways to relieve stress or communiacte about their emotions rather than being in close relationship (Pennebaker, 1997).Students with general comfort level with disclosure may go up due to conversational AI quick, nonjudgemental place for integrating ideas and feelings. The identified positive correlation between CAI and self disclosure into other people in hypothesis 1 can be described by extending this comfort to human relationships and similarly there was negative association of CAI with social connectedness. Self disclosure amid pressure, however, does not always have relationship intent. According to research, the primary objective of stress driven disclosure is frequently releasing of their emotions rather than making connection or relationships (Derlega et al.,1993). Students at universities may talk about private problems to friends. and peers without getting psychological support, understanding, attention, or reciprocity in return. Thus, disclosure does happen, but social connectedness does not rise which agrees to study's finding that self disclosure to other people has a small effect on social connectedness feeling.

According to second hypothesis, social connectedness and self disclosure would be strongly predicted by conversational AI dependency. This hypothesis was right. Regression analysis results showed that CAI significantly predicted self disclosure, implying that usage of CAI may make students more relaxed in conveying their feelings and thoughts that later translates to interactions between humans. However, social connectedness was strongly and negatively predicted by CAI, suggesting that lower feeling of connectedness is linked to higher dependency on CAI. Research on tech based

or digital communication that tells that technology can enhance communication frequency while also decreasing quality of relation, is consistent with the above dual structure. (Kraut et al., 1998; Putnam, 2000). AI can serve as a means of emotional outlet for students that are stressed allowing them to convey their feelings but also displacing their interaction with other people and decreasing their feeling of connectedness with other people.

The third hypothesis involves the association between CAI and social connectedness would be mediated by self disclosure. This hypothesis was rejected, as self disclosure to other people did not strongly predict the social connectednss and the indirect effect was insignificant even though CAI significantly predicted self disclosure and had huge direct influence on social connectedness (see table 4.6). the finding tells that impact of CAI on social connectedness cannot be explained by self disclosure. This is supported by research which tells that social connectedness needs reciprocity, acknowledgement of emotions, and trust rather than merely discloure (Altman &Taylor,1973; Baumeister &Leary, 1995). The lack mediation can be described by the idea that university students like in Pakistan living in collaborative, group oriented countries may disclose in consequence of stress or frustration without making any stronger relationship. As stressful events can make the person disclose about himself to other people and students in Pakistan face stress, depression and anxiety at higher level in their universities (Zhang,2017; Muneer et al., 2025). In the fourth hypothesis, the results indicated that there were no significant variations in conversational AI dependency in accordance with frequency of use of CAI, program of study and gender. CAI reliance is a more behavioral tendency of individual rather than any gender, discipline or usage-based differences.

According to ANOVA results for frequency usage of CAI and program of study there are no significant differences. Similarly in the reults of independent t test for gender, there were no significant differences between males and females. Individual expression is not taken into account of great importance in collectivistic cultures as much of importance given societal duties, handling of ones image, and unity among people (Triandis,1995). Pakistan has a collectivist culture that focuses on controlling of ones emotion like in friends and societal interactions. Outside of extremely close familial ties, sharing of ones psychological emotions are not really encouraged, notably when it comes to individual distress, worry or sensitivity (Hofstede,2001). During young age students started learning that talking about themselves to their friends can cause them face judgement, criticism, accusations, or decrease in place in society.as an outcome, opposed to individual setting where openness id often socially appreciated but disclosing about oneself is more cautious and hesitant. Moreover, family also plays very important role in influencing person social behavioue and also psychological growth. In Pakistani families, the reputations, morality, and decent character are extremely valuable in culture . So, a lot of young people focus on protecting their personal information and especially if that can be used to stigmatize them. So university students can't disclose this information to their friends and families so they move towards using conversational artificial intelligence, also when they disclose to peer it can be more for relieving stress rather than focusing on feeling of social connectedness.

Additionally, students have high academic stress, which weakens, the persons capacity to engage in interactions with others, stress do cause increase in communication frequency, but it also decreases the support and belongingness with society felt by person

(Hefner & Eisenberg, 2009). This tells why students CAI dependency is high and social connectedness becomes low while self-disclosure to other people due to high CAI also gets increased.

5.1. Implication of Study:

1. Conversational AI could act as a secure psychological medium letting students share their feelings without fearing being criticized, so better policies need to be made to ensure safe use of conversational AI.
2. Universities should make programs for digital literacy for students to understand the hazards and advantages of using conversational AI in a better way.
3. Government and educational policy makers must campaign for safe use of conversational AI in university students and ways to increase social connectedness among university students.
4. Support groups can be made within universities, or online to provide basic discussions and social connectivity activities to enhance social bonding.

5.2. Strength of Study:

1. The research contributes greatly to understanding conversational AI dependency involving self-disclosure and social connectedness among university students.
2. The main strength is quantitative research design, which allows for analysis of associations between conversational AI dependency and social connectedness.
3. The research also gives demographics insights, seeing how factors such as frequency of using conversational AI, program of study and gender of studies affect

conversational AI dependency. The research focuses on Pakistani university students whose social life is less measured as compared to their academic life.

4. The current research used validated and reliable instruments such as Conversational Artificial intelligence Dependency (CAIDS-20), Self disclosure of self and Social Connectedness Scale (SCS).

5.3. Limitations:

1. The study only focused on university students, not college or school students through artificial intelligence has reached the hands of young kids too.
2. The distinction between different conversational AI platforms was not made to make it more comprehensive.
3. Peer standards, family relations, and cultural issues were not directly measured that may have contributed to self disclosure and social connectedness or university students
4. The lack of emotional reciprocity of disclosing oneself may have also been affected by association with social connectedness.

5.4. Future Research Direction:

1. This research has only focused on university students from Lahore, Pakistan, future researches should involve other cities of Pakistan too.
2. For future research, there should be investigation of causal links between conversational AI reliance, self disclosure to others, and social connectedness in longitudinal studies.

3. Research may also look at moderatinng factors like personality traits, anxiety, stress, or loneliness.
4. The impact of organized AI interaction on real world disclosure and social connectedness could be examined through experimental designs.

5.5. Conclusion:

The present study has looked into the connections between Pakistani university students dependency n conversational AI, disclosing of self to others, and social connectedness. The results showed greater reliance on conversational AI which is also linked to less social connectedness but more disclosing self to others. This tells that conversational AI can make it easier to convey emotions like without directly enhancing interpersonal relationships. The lack of mediating impact also stresses hoe disclosure by itself do not cause increase in social connectedness. Student may disclose more while also feeling isolated in university environment, where cultural and social values, standards and educational stress may restrict emotional connection. Overall, the study stresses the significance of differentiating between interpersonal connection and emotional expression in order to understand the psychological effect of conversational AI.

References

Affandi, S., Ishaq, M. I., Raza, A., Talpur, Q., & Ahmad, R. (2025). AI assistant is my new best friend! Role of emotional disclosure, performance expectations, and intention to reuse. *Journal of Retailing and Consumer Services, 82,* 104087. https://doi.org/10.1016/j.jretconser.2024.104087

Aharony, N. (2016). Relationships among attachment theory, social capital perspective, personality characteristics, and Facebook self-disclosure. *Aslib Journal of Information Management, 68*(3), 362–386. https://doi.org/10.1108/ajim-01-2016-0001

AlMaskari, A. M., Al-Mahrouqi, T., Al Lawati, A., Al Aufi, H., Al Riyami, Q., & Al-Sinawi, H. (2025). Students' perceptions of AI mental health chatbots: An exploratory qualitative study at Sultan Qaboos University. *BMJ Open, 15*(10), e103893. https://doi.org/10.1136/bmjopen-2025-103893

Al-Zahrani, A. M. (2025). Exploring the impact of artificial intelligence chatbots on human connection and emotional support among higher education students. *SAGE Open, 15*(2). https://doi.org/10.1177/21582440251340615

Altman, I., & Taylor, D. A. (1973). *Social penetration: The development of interpersonal relationships.* Holt, Rinehart, & Winston.

Altarif, B., & Mubarak, M. (2022). Artificial intelligence: Chatbot—the new generation of communication. *Studies in Computational Intelligence*, 215–229.

Amjad, F. (2025). Comfort or isolation: Pakistanis weigh pros and cons of ChatGPT as confidant. *Arab News Pakistan.*

Asghar, S. (2025). Impact of perceived social support and psychological resilience on psychological well-being among university students. *Pakistan Social Sciences Review, 9*(2), 182–194. https://doi.org/10.35484/pssr.2025(9-II)14

Aziz, A., Emon, M. H., Tasnim, Z., Aziz, N., Rahman, M. A., & Hamid, A. B. A. (2025). Conversational AI for student well-being. In *Advances in Computational Intelligence and Robotics* (pp. 61–94). https://doi.org/10.4018/979-8-3373-3316-8.ch004

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529.

Bauer, K. L., Johnson-Koenke, R., & Fort, M. P. (2025). What is social connection in the context of human need: An interdisciplinary literature review. *International Journal of Environmental Research and Public Health, 22*(3), 363. https://doi.org/10.3390/ijerph22030363

Bettayeb, A. M., Talib, M. A., Altayasinah, A. S., & Dakalbab, F. (n.d.). Exploring the impact of ChatGPT: Conversational AI in education. *Frontiers in Education, 9.*

Cao, B., Hassan, N. C., & Omar, M. K. (2024). The impact of social support on burnout among lecturers: A systematic literature review. *Behavioral Sciences, 14*(8), 727.

Carpenter, A., & Greene, K. (2016). Social penetration theory. In *The International Encyclopedia of Interpersonal Communication* (1st ed.). John Wiley & Sons, Inc.

Chandra, M., Hernandez, J., Ramos, G., Ershadi, M., Bhattacharjee, A., Amores, J., Okoli, E., Paradiso, A., Warreth, S., & Suh, J. (2025). Longitudinal study on social and emotional use of AI and conversational agent.

Chen, Y., Wang, M., Yuan, S., & Zhao, Y. (2025). The development and validation of conversational AI dependence scale for Chinese college students. *Frontiers in Psychology, 16.*

Christoforakos, L., Feicht, N., Hinkofer, S., Loscher, A., Schlegl, S. F., & Diefenbach, S. (2021). Connect with me: Exploring influencing factors in a human-technology relationship based on regular chatbot use. *Frontiers in Digital Health, 3.* https://doi.org/10.3389/fdgth.2021.689999

Chuter, C. (2020, January 20). The importance of social connections in schools. *The Education Hub.* https://theeducationhub.org.nz/social-connection/

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness, and structural design. *Management Science, 32*(5), 513–644.

Darling, K. (2024, January 8). It's no wonder people are getting emotionally attached to chatbots. *Wired.* https://www.wired.com/story/its-no-wonder-people-are-getting-emotionally-attached-to-chatbots/

Delgado, M. R., Fareri, D. S., & Chang, L. J. (2023). Characterizing the mechanisms of social connections. *Neuron, 111*(24). https://doi.org/10.1016/j.neuron.2023.09.012

Fang, C. M., Liu, A. R., Danry, V., Lee, E., Chan, S. W. T., Pataranutaporn, P., Maes, P., Phang, J., Lampe, M., Ahmad, L., & Agrawal, S. (2025). How AI and human behaviors shape psychological effect of chatbot use: A longitudinal randomized controlled study.

Fang, C. M., Liu, A. R., Valdemar Danry, Lee, E., & Agarwal, S. (2025). How AI and human behaviors shape psychosocial effects of chatbot use: A longitudinal randomized controlled study. *ArXiv*. https://doi.org/10.48550/arxiv.2503.17473

Fearn, N. (2024, May 29). Educators warn AI must be a teaching—not a cheating—aid. *Financial Times.* https://www.ft.com/content/26ff910a-d19e-444b-9e4c-f06e6d546db3

Fitzpatrick, K. K., Darcy, A., & Vierhile, M. (2017). Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): A randomized controlled trial. *JMIR Mental Health, 4*(2). https://doi.org/10.2196/mental.7785

Gazi, M. A. I., Rahaman, M. A., Rabbi, M. F., Masum, M., Nabi, M. N., & Rahman, M. A. (2024). The role of social media in enhancing communication among individuals: Prospects and problems. *Environment and Social Psychology, 9*(11).

Giray, L. (2024). Conceptualizing AI addiction: Self-reported cases of addiction to an AI chatbot.

Guingrich, R., & Graziano, M. (2023). Chatbots as social companions: How people perceive consciousness, human likeness, and social health benefits in machines. *ArXiv*. https://doi.org/10.48550/arxiv.2311.10599

Guneyli, A., Burgul, N. S., Dericioglu, S., Cenkova, N., Becan, S., Simsek, S. E., & Guneralp, H. (2024). Exploring teacher awareness of artificial intelligence in education: A case study from Northern Cyprus. *European Journal of Investigation in Health, Psychology and Education*, *14*(8), 2358–2376.

Harvey, J., & Boynton, K. (2021). Self-disclosure and psychological resilience: The mediating roles of self-esteem and self-compassion. *Interpersona: An International Journal on Personal Relationships*, *15*(1), 90–104. https://doi.org/10.5964/ijpr.4533

Hefner, J., & Eisenberg, D. (2009). Social support and mental health among college students. *American Journal of Orthopsychiatry*, *79*(4), 491–499. https://doi.org/10.1037/a0016918

Herbener, A. B., & Damholdt, M. F. (2025). Are lonely youngsters turning to chatbot for companionship? The relationship between chatbot usage and social connectedness in Danish high school students. *International Journal of Human-Computer Studies, 196.*

Hou, I., Man, O., Hamilton, K., Muthusekaran, S., Johnykutty, J., Zadeh, L., & MacNeil, S. (2025). "All roads lead to ChatGPT": How generative AI is eroding social interactions and student learning communities. *ArXiv*.

Iqbal, S. (2023). Pakistan's draft national AI policy: Fostering responsible adoption and economic transformation. *International Bar Association.*

Jawad, M., Talreja, K., Sarfaraz Ahmed Bhutto, & Khurram Faizan. (2024). Investigating how AI personalization algorithms influence self-perception, group identity, and social interactions online. *Review of Applied Management and Social Sciences, 7*(4), 533–550. https://doi.org/10.47067/ramss.v7i4.397

Jiang, Z. Z. (2024). Self-disclosure to AI: The paradox of trust and vulnerability in human-machine interactions. *ArXiv*. https://doi.org/10.48550/arxiv.2412.20564

Joinson, A. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology, 31*(2), 177–192.

Joinson, A., Reips, U.-D., Buchanan, T., & Schofield, C. B. P. (2010). Privacy, trust, and self-disclosure online. *Human-Computer Interaction, 25*(1), 1–24.

Kausar, F. N., Rabia Bahoo, Rani Qaisara, & Waseem, M. (2024). Relationship between artificial intelligence and students' learning strategies at secondary level. *Pakistan Journal of Humanities and Social Sciences, 12*(4), 2970–2977. https://doi.org/10.52131/pjhss.2024.v12i4.2547

Kelley, P. G., Yang, Y., Heldreth, C., Moessner, C., Sedley, A., Kramm, A., Newman, D., & Woodruff, A. (2021). Exciting, useful, worrying and futuristic: Public perception of artificial intelligence in 8 countries.

Khatri, C., Venkatesh, A., Hedayatnia, B., Ram, A., Gabriel, R., & Prasad, R. (2018). Alexa Prize—State of art in conversational AI. *AI Magazine, 39*(3), 3–96.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*(9), 1017–1031.

Laun, M., & Wolff, F. (2025). Chatbots in education: Hype or help? A meta-analysis. *Learning and Individual Differences, 119,* 102646. https://doi.org/10.1016/j.lindif.2025.102646

Lee, R., & Robbins, S. B. (1995). Measuring belongingness: The social connectedness and the social assurance scales. *Journal of Counseling Psychology, 42*(2), 232–241.

Limna, P., Kraiwanit, T., Jangjarat, K., Klayklung, P., & Chocksathaporn, P. (2023). The use of ChatGPT in digital era: Perspectives on chatbot implementation. *Journal of Applied Learning and Teaching, 6*(1), 64–74.

Liu, A. R., Pataranutaporn, P., & Maes, P. (2025). Chatbot companionship: A mixed method study of companion chatbot usage pattern and their relationship to loneliness in active users. *ArXiv:2410.21596.*

Appendix

Permission letter

Bahria University
Discovering Knowledge

BULC/PSY/2025/ 325

11th November 2025

Permission Letter

Subject: Request for Cooperation for Collecting Research Data

To Whom It May Concern

Respected Sir/Ma'am,

Bahria University is a Federally Chartered Public Sector University. Bahria University was established by the Pakistan Navy in 2000. Since then, it has steadily grown into one of Pakistan's leading higher education institutions with campuses in Islamabad, Karachi, and Lahore.

The Department of Professional Psychology (DPP) was established in 2018. The Department offers both BS Psychology and MS Clinical Psychology Programs, aims to give quality education, and promotes ethical and competent psychology practice in Pakistan.

Ms. Yumna Shahzad, *a student* of Bahria University Lahore Campus, currently enrolled in BS Psychology, VIII Semester. She is conducting final year research entitled ***"Conversational Artificial Intelligence dependency, Self Disclosure to others and Social connectedness among University Students."***

For this purpose, she needs to collect data from your institute/organization. The information provided will remain confidential, and we will ensure the ethical responsibility of all our participants. The results concluded from the collected data will be used only for educational purposes. The identity of any participant will not be disclosed at any time.

We would like to seek your cooperation in conducting this research. Your assistance in our scientific pursuit will be highly appreciated and acknowledged.

Thanking you in anticipation.

Supervisor

Ms. Saima Bano
Sr. Lecturer

Dr. Khawer Bilal Baig
Senior Associate Professor/ HOD
Department of Professional Psychology
Bahria University Lahore Campus

Conversational Artificial Intelligence Dependency, Self-disclosure to others and Social Connectedness among University Students

Consent Form

My name is Yumna Shahzad, a BS Psychology student conducting research under the supervision of Ms. Saima Bano at Bahria University, Lahore Campus. This study aims to examine how student's dependency on conversational AI affects their self-disclosure, and social connectedness. The survey will take 10-15 minutes and can be completed at your convenience. Participation is voluntary.

There may be no direct benefits to you, but your responses will help deepen the understanding of this topic. All information will remain confidential and anonymized; no identifying details will be linked to your data. Only the researcher will access the stored data, and results will be presented collectively. By signing below, you confirm that you have read and understood the information above and agree to participate voluntarily. For any questions, please contact the researcher.

Researcher:
yumnashahzad666@gmail.com

Participant signature: ----------

Participant Email: ----------

Demographics

Do you use Conversational Artificial Intelligence like ChatGPT, character AI?

- ❑ Yes
- ❑ No

If YES, then please proceed to next question

1. Demographics

A) Age: _____ (In years)

B) Gender:

- ❑ Male
- ❑ Female

Do you face any kind of physical and psychological challenges (psychological disorders like severe depression etc)?

- ❑ Yes
- ❑ No

If NO, then please proceed to next question

How frequently do you use conversational artificial intelligence?

- ❑ Several times a day
- ❑ Several times a week
- ❑ Several times a month

What is your purpose of use of Conversational artificial intelligence?

- ❑ Academic
- ❑ Personal

2. Educational Background

A) Program of study

- ❑ STEM (Science, Technology, Engineering, Mathematics)
- ❑ Humanities (Literature, Philosophy, History, Language)
- ❑ Social sciences (Psychology, Sociology, Economics, Political Science)
- ❑ Allied Health Sciences (Pharm-D, Physiotherapy, Radiology, Nutrition

B) What is your current study level?

- ❑ Under graduation
- ❑ Post-graduation

C) Type of Institution:

- ❑ Public University
- ❑ Private University

SECTION I

In the past year

		Completely Disagree	**Mostly Disagree**	**Slightly disagree**	**Slightly Agree**	**Mostly Agree**	**Completely Agree**
1	I often spend a lot of time thinking about or planning to use Conversational artificial intelligence (CAI).						
2	CAI has become an indispensable part of my daily life and studies.						
3	I find myself using CAI more and more frequently.						
4	Each time I use CAI, the time spent always exceeds my original plan.						
5	I often rely on the analysis and suggestions provided by CAI to guide						

	my daily decisions.						
6	I feel irritable when CAI is unavailable.						
7	I feel anxious or worried when CAI is inaccessible.						
8	I feel a sense of loss when I can't access CAI.						
9	I feel helpless and confused when I am unable to use CAI.						
10	I feel like I cannot stop using CAI.						
11	When experiencing negative emotions (such as depression, anxiety, helplessness, guilt, etc.), I tend to use CAI for comfort.						
12	When I feel irritable, I usually use CAI to seek relief.						
13	When I feel lonely, I tend to use CAI to pass the time.						

14	Using CAI effectively helps improve my mood.						
15	People around me often say that I spend too much time using CAI.						
16	After frequently using CAI, I find it more difficult to engage in independent thinking.						
17	Frequent use of CAI has negatively impacted my studies or life.						
18	After using CAI frequently, I have lost interest in other hobbies.						
19	After frequently using CAI, my interactions with friends or family have decreased.						
20	After frequent use of CAI, I feel my ability to engage in active thinking has deteriorated.						

SECTION II

Please indicate how accurately each statement describes your typical level of self-disclosure. Use the rating scale from 1 to 9, where 1 represents "Strongly Disagree" and 9 represents "Strongly Agree." There are no right or wrong responses. Your answers should reflect your genuine behavior and the extent to which you usually share personal thoughts, feelings, and experiences with others. Please respond to every item independently and as honestly as possible.

	Item	1	2	3	4	5	6	7	8	9
		Strongly Disagree	**Disagree**	**Somewhat Disagree**	**Slightly Disagree**	**Neutral**	**Slightly Agree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
1	I revealed a lot of information about myself.									
2	I revealed important information about myself.									
3	I discussed things that revealed my authentic self.									
4	I revealed meaningful information about myself.									
5	I discussed a number of different topics that are relevant to me.									

SECTION III

Directions: Following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the

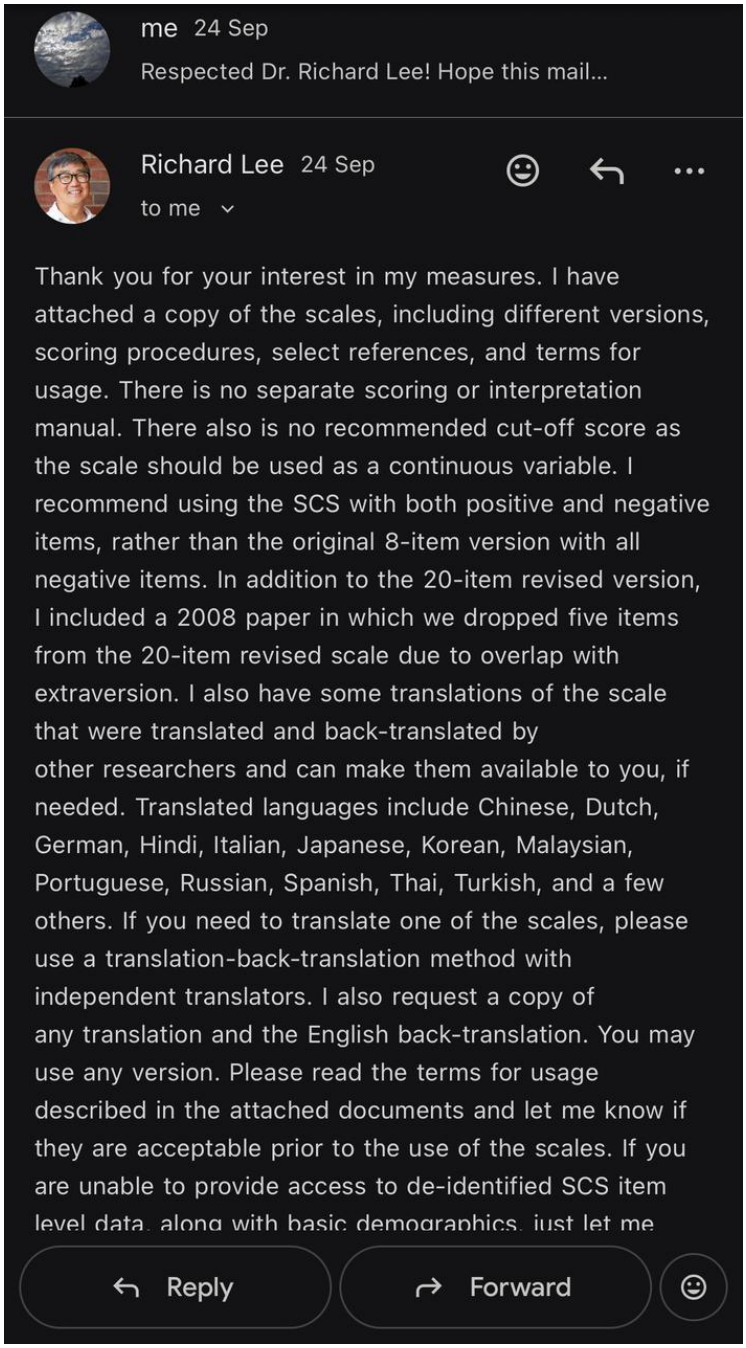
following scale (1 = Strongly Disagree and 6 = Strongly Agree). There is no right or wrong

answer. Do not spend too much time with any one statement and do not leave any unanswered.

1 = Strongly Disagree 2 = Disagree 3 = Mildly Disagree 4 = Mildly Agree 5 = Agree 6 = Strongly Agree

	Item	Strongly Disagree (1)	Disagree (2)	Mildly Disagree (3)	Mildly Agree (4)	Agree (5)	Strongly Agree (6)
1	I feel comfortable in the presence of strangers.						
2	I am in tune with the world.						
3	Even among my friends, there is no sense of brother/sisterhood.						
4	I fit in well in new situations.						
5	I feel close to people.						
6	I feel disconnected from the world around me.						
7	Even around people I know, I don't feel that I really belong.						
8	I see people as friendly and approachable.						
9	I feel like an outsider.						

10	I feel understood by the people I know.						
11	I feel distant from people.						
12	I am able to relate to my peers.						
13	I have little sense of togetherness with my peers.						
14	I find myself actively involved in people's lives.						
15	I catch myself losing a sense of connectedness with society.						
16	I am able to connect with other people.						
17	I see myself as a loner.						
18	I don't feel related to most people.						
19	My friends feel like family						
20	I don't feel I participate with anyone or any group						



me 24 Sep

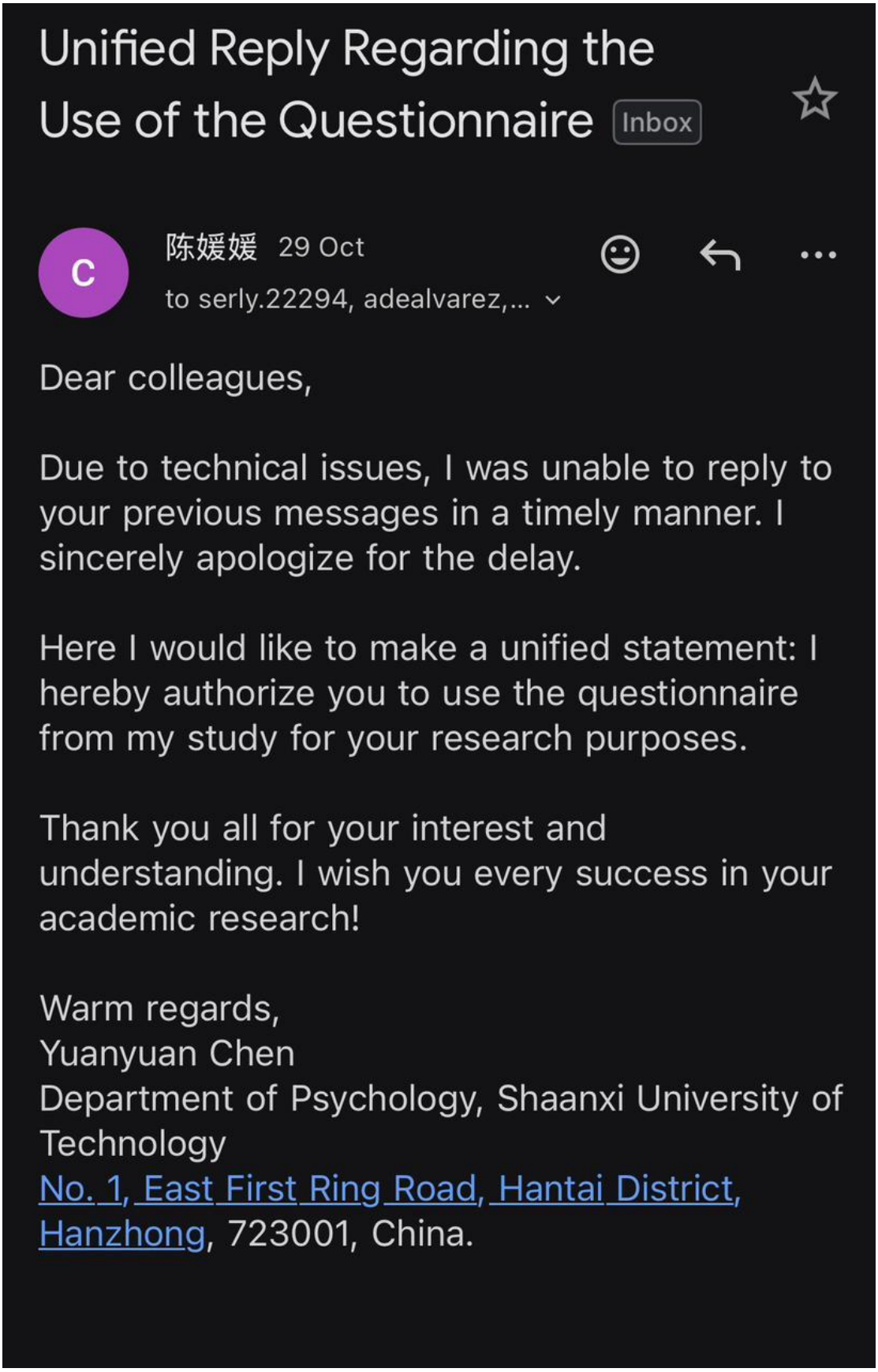
Respected Dr. Richard Lee! Hope this mail...

Richard Lee 24 Sep

to me

Thank you for your interest in my measures. I have attached a copy of the scales, including different versions, scoring procedures, select references, and terms for usage. There is no separate scoring or interpretation manual. There also is no recommended cut-off score as the scale should be used as a continuous variable. I recommend using the SCS with both positive and negative items, rather than the original 8-item version with all negative items. In addition to the 20-item revised version, I included a 2008 paper in which we dropped five items from the 20-item revised scale due to overlap with extraversion. I also have some translations of the scale that were translated and back-translated by other researchers and can make them available to you, if needed. Translated languages include Chinese, Dutch, German, Hindi, Italian, Japanese, Korean, Malaysian, Portuguese, Russian, Spanish, Thai, Turkish, and a few others. If you need to translate one of the scales, please use a translation-back-translation method with independent translators. I also request a copy of any translation and the English back-translation. You may use any version. Please read the terms for usage described in the attached documents and let me know if they are acceptable prior to the use of the scales. If you are unable to provide access to de-identified SCS item level data, along with basic demographics, just let me

Reply Forward



Unified Reply Regarding the Use of the Questionnaire Inbox

C 陈媛媛 29 Oct

to serly.22294, adealvarez,...

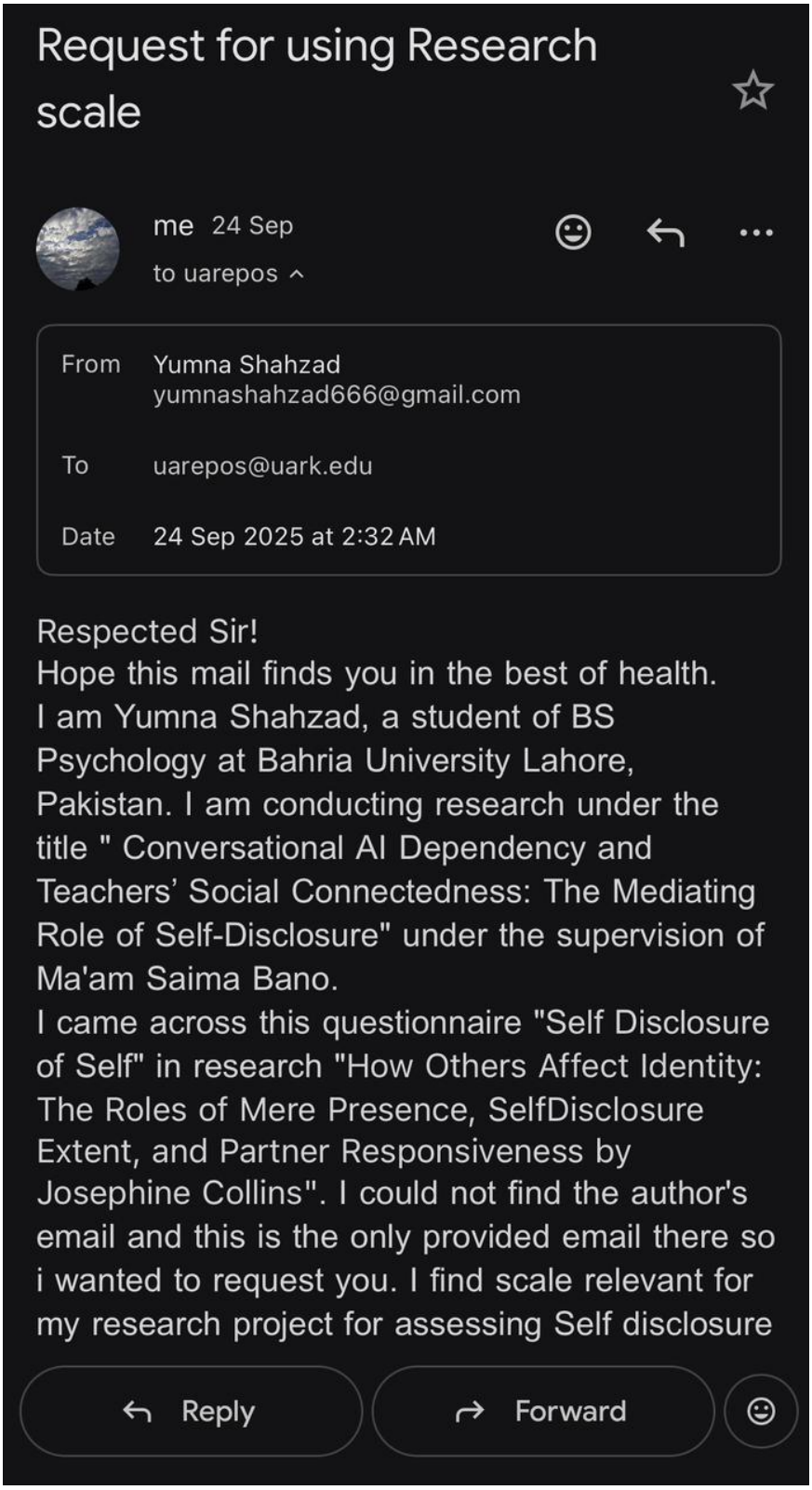
Dear colleagues,

Due to technical issues, I was unable to reply to your previous messages in a timely manner. I sincerely apologize for the delay.

Here I would like to make a unified statement: I hereby authorize you to use the questionnaire from my study for your research purposes.

Thank you all for your interest and understanding. I wish you every success in your academic research!

Warm regards,
Yuanyuan Chen
Department of Psychology, Shaanxi University of Technology
No. 1, East First Ring Road, Hantai District, Hanzhong, 723001, China.



Request for using Research scale

me 24 Sep

to uarepos

From Yumna Shahzad
yumnashahzad666@gmail.com

To uarepos@uark.edu

Date 24 Sep 2025 at 2:32 AM

Respected Sir!
Hope this mail finds you in the best of health.
I am Yumna Shahzad, a student of BS Psychology at Bahria University Lahore, Pakistan. I am conducting research under the title " Conversational AI Dependency and Teachers' Social Connectedness: The Mediating Role of Self-Disclosure" under the supervision of Ma'am Saima Bano.
I came across this questionnaire "Self Disclosure of Self" in research "How Others Affect Identity: The Roles of Mere Presence, SelfDisclosure Extent, and Partner Responsiveness by Josephine Collins". I could not find the author's email and this is the only provided email there so i wanted to request you. I find scale relevant for my research project for assessing Self disclosure

Reply Forward