



Technology Advanced Anxiety Syndrome (TAAS) among University Students: The Roles of Self-Esteem, Fear of Missing Out, and Technology Self-Efficacy

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ARTICLE INFO	ABSTRACT
Article History: Received 23 March 2025 Received in revised form 4 June 2025 Accepted 10 July 2025 Available online 2 December 2025 Keywords: Technology Advanced Anxiety Syndrome (TAAS); Technology-related anxiety; Fear of missing out; Self-esteem; Technology self-efficacy; Digital well-being; University students	The rapid integration of advanced technologies into everyday and academic life has been accompanied by new forms of psychological strain. This study examined the associations between Technology Advanced Anxiety Syndrome (TAAS), a proposed construct describing cognitive, emotional, behavioral and physiological responses to rapidly evolving technologies, and self-esteem, fear of missing out (FOMO) and technology self-efficacy. In a cross-sectional correlational design, 250 undergraduate and postgraduate students at universities in Dushanbe, Tajikistan, recruited by convenience sampling, completed a researcher-developed TAAS scale, the Rosenberg Self-Esteem Scale, the Fear of Missing Out Scale and a technology self-efficacy scale. TAAS was negatively correlated with self-esteem ($r = -.52$) and technology self-efficacy ($r = -.48$) and positively correlated with FOMO ($r = .65$). In multiple regression, the three predictors together explained 53% of the variance in TAAS; FOMO was the strongest predictor ($\beta = .50$), followed by self-esteem and technology self-efficacy (both $\beta = -.21$). The findings suggest that technology-related anxiety among students reflects not only technological complexity but also the social and self-evaluative pressures of digital participation and perceived competence. Universities may benefit from digital well-being programs that address FOMO and self-esteem alongside technical skills. Because the design is cross-sectional and the TAAS scale is newly developed, the results should be interpreted as associations that require replication with validated measures.

1. INTRODUCTION

1.1. Background and Problem Statement

The rapid advancement of digital technologies has transformed contemporary society, reshaping communication patterns, educational systems, economic structures, and everyday experience. Over the past two decades, social

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media platforms, artificial intelligence, cloud computing, virtual reality, and mobile technologies have become deeply embedded in daily life. These developments have created unprecedented opportunities for access to information, social connection, and productivity. At the same time, a growing body of research indicates that they also generate psychological demands that some individuals find difficult to meet.

Concern about the psychological costs of technology is not new. Brod introduced the term technostress to describe a modern disease of adaptation arising from an inability to cope with new computer technologies in a healthy manner [1], and research on computer anxiety developed instruments to measure apprehension about computer use [2]. More recent work has identified specific technostress creators, such as techno-overload, techno-complexity, and techno-uncertainty, and has linked them to role stress and reduced productivity [3]. Information overload, which arises when the volume of information exceeds an individual's processing capacity, has likewise been associated with stress and impaired decision-making [4]. Social media use has been associated with sleep disturbance among young adults [5], and compulsive social media use has been linked to fatigue, anxiety, and depression [6].

University students are a particularly relevant population in this respect. Their academic, social, and professional lives depend heavily on digital technologies, they are frequent users of social media, and they are expected to adapt continuously to new learning platforms and tools. Understanding which psychological characteristics make students more or less vulnerable to technology-related anxiety is therefore both theoretically important and practically useful for higher education institutions.

1.2. Technology Advanced Anxiety Syndrome as a Proposed Construct

Within this context, the present study uses the term Technology Advanced Anxiety Syndrome (TAAS) to describe a constellation of cognitive, emotional, behavioral, and physiological responses associated with exposure to rapidly evolving technologies. TAAS is conceptualized as involving persistent concerns about technological competence, fear of technological obsolescence, difficulty adapting to new digital systems, and anxiety arising from continuous technological change. The term "syndrome" is used descriptively to denote a co-occurring set of responses; TAAS is not a recognized psychiatric diagnosis. Rather, it is proposed as a construct within the broader field of digital mental health that extends earlier concepts such as computer anxiety [2] and technostress [1, 3]. Whereas computer anxiety refers primarily to apprehension about operating computers, and technostress has largely been studied in organizational settings, TAAS emphasizes anxiety about keeping pace with the speed and breadth of technological change in everyday life.

1.3. Psychological Correlates of Technology-Related Anxiety

Several psychological characteristics may contribute to the development and maintenance of TAAS. One of the most prominent is fear of missing out (FOMO), defined as a pervasive apprehension that others may be having rewarding experiences from which one is absent, accompanied by a desire to stay continually connected with what others are doing [7]. Social media platforms and real-time communication technologies may intensify FOMO by providing continuous opportunities for social comparison and a constant stream of updates. FOMO has been associated with lower need satisfaction, lower mood, and lower life satisfaction [7], with problematic smartphone use and with anxiety and depression [8], and with compulsive social media use that contributes to fatigue and psychological distress [6].

A second relevant characteristic is self-esteem, which reflects an individual's overall evaluation of personal worth [9]. Longitudinal meta-analytic evidence indicates that low self-esteem prospectively predicts anxiety [10]. In digital environments, where idealized self-presentations are common, frequent social media use has been associated with lower self-esteem through upward social comparison [11]. Individuals with lower self-esteem may therefore be more likely to interpret technological demands and online social engagement as threats to their competence and social standing.

A third characteristic is technology self-efficacy, defined as an individual's belief in his or her ability to use and manage technological tools effectively. Self-efficacy is central to Bandura's theory of behavioral change [12], and research on computer self-efficacy has shown that individuals with higher self-efficacy experience less computer

anxiety and use computers more [13]. Technology self-efficacy may thus function as a protective factor, enabling individuals to approach new systems with confidence rather than apprehension.

1.4. Research Gap and Aims

Despite the growing literature on technostress, digital anxiety, and FOMO, relatively few studies have examined self-esteem, FOMO, and technology self-efficacy simultaneously as correlates of technology-related anxiety. As a result, their relative contributions remain unclear: it is not known whether technology-related anxiety is driven mainly by perceived technical competence, by self-evaluative vulnerability, or by the social pressures of digital participation. In addition, most of this research has been conducted in Western and East Asian settings, and evidence from Tajik university students is limited. Finally, existing constructs such as computer anxiety and technostress do not fully capture anxiety about the pace of technological change in everyday life, which TAAS is intended to address.

The present study therefore aimed to examine the relationships between TAAS and self-esteem, FOMO, and technology self-efficacy among university students in Dushanbe, and to determine the relative contribution of each characteristic to individual differences in TAAS. In doing so, it seeks to contribute to theory by testing an integrated model that combines cognitive-behavioral, social-cognitive, and stress-appraisal perspectives, and to practice by identifying targets for interventions to support students' digital well-being.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

2.1. Cognitive-Behavioral Theory

According to cognitive-behavioral theory, anxiety arises from maladaptive cognitions, including irrational beliefs and negative automatic thoughts about the self and the environment [14]. Applied to technology, individuals experiencing TAAS may hold beliefs such as "If I fail to keep up with technological advances, I will fall behind others" or "I am incapable of coping with the increasing complexity of digital technologies." Such cognitive distortions may heighten emotional distress and physiological arousal and encourage avoidance of new technologies, which in turn prevents the corrective experiences that could reduce anxiety. This framework is relevant to self-esteem in particular: individuals with a negative global self-evaluation may be more prone to catastrophic appraisals of their technological competence.

2.2. Social Cognitive Theory

Bandura's social cognitive theory emphasizes the reciprocal interaction of personal factors, environmental influences, and behavior [15]. Within this framework, individuals may acquire technology-related attitudes and anxiety responses through observational learning and social comparison. A central construct of the theory is self-efficacy, the belief in one's capability to perform specific tasks successfully [12]. Individuals with high self-efficacy approach difficult tasks as challenges to be mastered rather than threats to be avoided. Technology self-efficacy is therefore expected to function as a protective factor, reducing anxiety associated with technological adaptation [13].

2.3. Stress and Coping Theory

Lazarus and Folkman's transactional model conceptualizes psychological stress as the outcome of an individual's appraisal of environmental demands relative to the resources available for coping [16]. Rapid technological change, information overload, and continuous digital connectivity may be appraised as significant stressors [3, 4]. When these demands are appraised as exceeding coping resources, anxiety is likely to follow; when resources such as self-efficacy and self-esteem are perceived as adequate, the same demands may be appraised as manageable. This model provides a framework for integrating the three predictors examined in this study: FOMO may increase the perceived demands of digital environments, whereas self-esteem and technology self-efficacy may strengthen perceived coping resources.

2.4. Technology Dependency Perspective

Increasing reliance on digital technologies for communication, education, work, and social interaction may also create psychological vulnerability. Research on nomophobia, the discomfort or anxiety experienced when one is unable to use a mobile phone, suggests that dependency on virtual environments can generate anxiety when access to technology is disrupted [17]. FOMO is closely related to this dependency, as it motivates continuous monitoring of online information and social activity [7, 8]. This perspective suggests that technology-related anxiety may stem not only from difficulties in using technology but also from the fear of being disconnected from it.

2.5. Integrative Model and Hypotheses

Taken together, these perspectives suggest that TAAS is a multifaceted phenomenon arising from the interaction of cognitive appraisals, social influences, self-efficacy beliefs, and coping resources. Based on this framework, the following hypotheses were formulated:

H1. Self-esteem is negatively associated with TAAS.

H2. Technology self-efficacy is negatively associated with TAAS.

H3. FOMO is positively associated with TAAS.

H4. Self-esteem, technology self-efficacy, and FOMO jointly and uniquely predict TAAS.

In addition, the study addressed the following research question: **RQ1.** Which of the three psychological characteristics is the strongest unique predictor of TAAS?

3. METHOD

3.1. Research Design

This study used an applied, cross-sectional, descriptive-correlational design. No variables were manipulated; the aim was to examine naturally occurring associations among TAAS, self-esteem, FOMO, and technology self-efficacy in the target population.

3.2. Population, Sampling, and Participants

The target population consisted of undergraduate and postgraduate students enrolled in public and private universities in Dushanbe, Tajikistan, during the 2024–2025 academic year. A target sample size of 384 was set using Cochran's formula for large populations at a 95% confidence level and a $\pm 5\%$ margin of error [18], and participants were recruited through convenience sampling. A total of 250 students completed the questionnaire and constitute the analytic sample. Because sampling was non-probabilistic, the sample size is not interpreted as ensuring representativeness; for the planned regression with three predictors, a sample of 250 provides ample statistical power to detect medium-sized effects. The sample comprised 130 women (52%) and 120 men (48%), with a mean age of 21.5 years ($SD = 2.8$).

3.3. Instruments

Technology Advanced Anxiety Syndrome Scale. TAAS was assessed with a researcher-developed instrument designed to measure technology-related anxiety, concerns about technological adaptation, and psychological and physiological symptoms associated with the use of advanced technologies. Before administration, the scale underwent content validity assessment and reliability testing. Higher scores indicate higher levels of TAAS.

Rosenberg Self-Esteem Scale (RSES). Self-esteem was measured with the RSES [9], a widely used 10-item instrument assessing global self-worth and self-acceptance. Higher scores indicate higher self-esteem.

Fear of Missing Out Scale. FOMO was measured with the Fear of Missing Out Scale [7], which assesses individuals' concerns about missing rewarding social experiences, information, or opportunities and the desire to stay continually connected. Higher scores indicate higher FOMO.

Technology Self-Efficacy Scale. Technology self-efficacy was assessed with a scale based on Bandura's self-efficacy framework [12], measuring individuals' confidence in their ability to use and adapt to digital technologies. Higher scores indicate higher self-efficacy.

The psychometric properties of the instruments in the present sample, including internal consistency coefficients, were not available when this article was prepared; this is acknowledged as a limitation (Section 5.7).

3.4. Procedure and Ethical Considerations

Questionnaires were administered to students who agreed to participate. Participation was voluntary and anonymous, and participants were informed of the purpose of the study and of their right to withdraw at any time. Formal approval from an ethics committee was not obtained.

3.5. Data Analysis

Data were analyzed using IBM SPSS Statistics. Descriptive statistics (means, standard deviations, minimum and maximum scores, frequencies, and percentages) were computed to summarize participant characteristics and study variables. Pearson correlation coefficients were used to examine bivariate associations (H1–H3). Multiple linear regression analysis was then used to examine the joint and unique contributions of self-esteem, FOMO, and technology self-efficacy to TAAS (H4 and RQ1). Before the regression analysis, the assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity were examined. The significance level was set at .05.

4. RESULTS

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics for the study variables. The mean TAAS score ($M = 35.80$, $SD = 8.20$) lay close to the midpoint of the observed range (15–55), indicating a moderate level of technology-related anxiety in the sample. The mean self-esteem score ($M = 22.40$, $SD = 4.10$) lay above the midpoint of its observed range, whereas the mean FOMO score ($M = 28.50$, $SD = 6.30$) lay slightly below the midpoint of its range, indicating a moderate level of concern about missing social and informational experiences. The mean technology self-efficacy score ($M = 42.10$, $SD = 7.50$) lay near the midpoint of its observed range.

Table 1. Descriptive Statistics of the Study Variables (N = 250)

Variable	<i>M</i>	<i>SD</i>	Minimum	Maximum
TAAS	35.80	8.20	15	55
Self-esteem	22.40	4.10	10	30
FOMO	28.50	6.30	15	45
Technology self-efficacy	42.10	7.50	25	60

Note. TAAS = Technology Advanced Anxiety Syndrome; FOMO = fear of missing out. Minimum and maximum are observed scores.

4.2. Correlation Analysis

Table 2 presents the Pearson correlations among the study variables. As expected, TAAS was negatively correlated with self-esteem ($r = -.52$, $p < .01$) and with technology self-efficacy ($r = -.48$, $p < .01$), supporting H1 and H2. TAAS was positively correlated with FOMO ($r = .65$, $p < .01$), supporting H3; this was the strongest bivariate association in the matrix. Self-esteem was positively correlated with technology self-efficacy ($r = .55$) and negatively correlated with FOMO ($r = -.40$), and FOMO was negatively correlated with technology self-efficacy ($r = -.32$). All correlations were statistically significant at $p < .01$.

Table 2. Pearson Correlations Among the Study Variables (N = 250)

Variable	1	2	3	4
1. TAAS				
2. Self-esteem	-.52**			
3. FOMO	.65**	-.40**		
4. Technology self-efficacy	-.48**	.55**	-.32**	

Note. ** $p < .01$ (two-tailed). With N = 250, any correlation with an absolute value of .17 or greater is significant at $p < .01$.

4.3. Multiple Regression Analysis

The assumptions of normality, linearity, and homoscedasticity were examined and found to be satisfactory. Variance inflation factors (VIF) ranged from 1.21 to 1.56, indicating no evidence of problematic multicollinearity.

The regression model was statistically significant, $F(3, 246) = 93.26, p < .001$, and the three predictors together explained 53% of the variance in TAAS ($R^2 = .53$, adjusted $R^2 = .53$), which corresponds to a large effect size (Cohen's $f^2 = 1.14$). As shown in Table 3, all three predictors made significant unique contributions, supporting H4. In response to RQ1, FOMO was the strongest unique predictor of TAAS ($\beta = .50, t = 10.45, p < .001$), followed by self-esteem ($\beta = -.21, t = -3.78, p < .001$) and technology self-efficacy ($\beta = -.21, t = -3.92, p < .001$).

Table 3. Multiple Regression Analysis Predicting TAAS (N = 250)

Predictor	β	t	p
Self-esteem	-.21	-3.78	< .001
FOMO	.50	10.45	< .001
Technology self-efficacy	-.21	-3.92	< .001

Note. β = standardized regression coefficient. $R^2 = .53$; adjusted $R^2 = .53$; $F(3, 246) = 93.26, p < .001$.

4.4. Summary of Hypothesis Testing

Table 4 summarizes the results of hypothesis testing.

Table 4. Summary of Hypothesis Testing

No.	Statement	Result
H1	Self-esteem is negatively associated with TAAS	Supported
H2	Technology self-efficacy is negatively associated with TAAS	Supported
H3	FOMO is positively associated with TAAS	Supported
H4	The three characteristics jointly and uniquely predict TAAS	Supported
RQ1	Strongest unique predictor of TAAS	FOMO

5. DISCUSSION

This study examined the relationships between TAAS and three psychological characteristics, self-esteem, FOMO, and technology self-efficacy, among university students in Dushanbe. All three characteristics were significantly associated with TAAS in the expected directions, and together they accounted for a substantial proportion of its variance. The following sections interpret these findings in relation to theory and previous research.

5.1. Self-Esteem and TAAS

The negative association between self-esteem and TAAS (H1) is consistent with longitudinal evidence that low self-esteem is a vulnerability factor for anxiety [10]. From a cognitive-behavioral perspective [14], individuals with a negative global self-evaluation may be more likely to interpret technological challenges as evidence of personal inadequacy, which fuels anxious appraisals and avoidance. Digital environments may amplify this process. Frequent exposure to idealized self-presentations on social media has been associated with lower self-esteem through upward social comparison [11], and students with lower self-esteem may experience technological change as an additional arena in which they compare unfavorably with peers. Conversely, students with higher self-esteem may perceive technological challenges as manageable and as opportunities for learning rather than as threats.

5.2. FOMO as the Strongest Correlate of TAAS

The strongest association observed in this study was between TAAS and FOMO (H3 and RQ1). This finding suggests that technology-related anxiety is rooted not only in difficulties with technology itself but also in the social and emotional dynamics of digital participation. It is consistent with research showing that FOMO is associated with problematic smartphone use, anxiety, and depression [8], and that FOMO and compulsive social media use contribute to fatigue and psychological distress [6]. Individuals with high FOMO may experience persistent concern about missing important information, social events, or technological developments, which can promote compulsive monitoring of online platforms and a sense of dependency on continuous connectivity [17]. Within the transactional model of stress [16], FOMO may thus increase the perceived demands of digital environments, making technological change appear more threatening.

The prominence of FOMO also refines the way in which TAAS can be understood. Earlier constructs such as computer anxiety emphasized apprehension about operating technology [2], and technostress research has emphasized organizational demands such as overload and complexity [3]. The present findings suggest that, for students, an important source of technology-related anxiety lies in the fear of being socially and informationally left behind. This social dimension distinguishes TAAS from purely competence-based conceptions of technology anxiety.

5.3. Technology Self-Efficacy and TAAS

The negative association between technology self-efficacy and TAAS (H2) supports social cognitive theory, which holds that perceived competence reduces anxiety and facilitates adaptive behavior [12, 15]. The finding is consistent with research showing that computer self-efficacy is associated with lower computer anxiety [13]. Students who believe that they can learn and use new technologies effectively are likely to approach innovations with confidence, whereas those with lower self-efficacy may perceive technological demands as overwhelming. Technology self-efficacy was also positively correlated with self-esteem, which suggests that competence beliefs and global self-evaluation may operate together as coping resources.

5.4. The Joint Contribution of the Predictors

The regression analysis showed that self-esteem, FOMO, and technology self-efficacy each made unique contributions to TAAS and together explained a large share of its variance. FOMO made the largest unique contribution, whereas self-esteem and technology self-efficacy made smaller contributions of broadly similar magnitude. This pattern suggests that interventions focused exclusively on technical skills may be insufficient to reduce technology-related anxiety, because a substantial part of that anxiety appears to be linked to social and self-evaluative processes. Because the three predictors were themselves intercorrelated, however, their unique contributions should be interpreted with caution; some of the variance they explain in TAAS is shared, and the relative ordering of self-esteem and technology self-efficacy in particular may not be robust across samples.

5.5. Theoretical Implications

This study contributes to the emerging literature on technology-related anxiety in three ways. First, it provides empirical evidence linking the proposed TAAS construct to self-esteem, FOMO, and technology self-efficacy, thereby offering initial evidence of its nomological network. Second, the findings support an integrative framework

in which cognitive appraisals [14], self-efficacy beliefs [15], and the balance between perceived demands and coping resources [16] jointly shape emotional responses to technological environments. Third, the prominence of FOMO extends existing research by suggesting that technology-related anxiety may be partly rooted in needs for social connectedness and fear of social exclusion, which highlights the importance of integrating social-psychological factors into future conceptualizations of technology-related anxiety.

5.6. Practical Implications

The findings have several practical implications for higher education institutions and mental health professionals. First, interventions to reduce technology-related anxiety should address not only technological competencies but also the psychological factors that shape students' interactions with technology; programs that strengthen self-esteem and technology self-efficacy may help students adapt with greater confidence to rapidly changing digital environments. Second, given the prominent role of FOMO, universities may benefit from digital well-being initiatives that promote healthy technology use, emotion regulation skills, and awareness of social comparison processes, for example through workshops on responsible social media use, digital balance, and mindful technology use. Third, integrating digital mental health screening into university counseling services may help identify students at risk of technology-related anxiety and provide targeted support.

5.7. Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design precludes causal conclusions; for example, students with high TAAS may develop lower self-efficacy as a consequence of their anxiety, rather than the reverse. Second, all data were collected with self-report measures from a single source, which may be affected by social desirability and common method variance. Third, convenience sampling of students in Dushanbe limits the generalizability of the findings to other populations, age groups, and cultural contexts, and the analytic sample ($N = 250$) was smaller than the planned sample of 384. Fourth, TAAS was measured with a newly developed instrument, and reliability coefficients for the instruments in the present sample are not reported; further work is required to establish the psychometric properties of the TAAS scale, including its factor structure, internal consistency, and discriminant validity with respect to related constructs such as computer anxiety, technostress, and nomophobia [2, 3, 17]. Fifth, the sources of the FOMO and technology self-efficacy instruments and their adaptation for Tajik students should be documented in more detail in future work.

5.8. Directions for Future Research

Future research should use longitudinal designs to establish the temporal ordering of TAAS, self-esteem, FOMO, and technology self-efficacy. Researchers are also encouraged to examine additional variables, such as psychological resilience, social support, attachment styles, personality traits, emotion regulation, and digital literacy, and to test mediating and moderating mechanisms; for example, FOMO may mediate the association between self-esteem and TAAS. Intervention studies evaluating cognitive-behavioral approaches, mindfulness-based programs, and digital literacy training would provide valuable evidence for reducing technology-related anxiety. Finally, psychometric studies of the TAAS scale, including confirmatory factor analysis and cross-cultural validation, are needed to establish TAAS as a distinct construct.

6. CONCLUSION

This study shows that technology-related anxiety among university students is closely linked to psychological characteristics that extend beyond technical skill. Fear of missing out emerged as the strongest correlate of TAAS, while self-esteem and technology self-efficacy were associated with lower levels of anxiety. These findings suggest that anxiety associated with advanced technologies is not solely a consequence of technological exposure; it also reflects how individuals interpret technological demands, evaluate their own capabilities, and respond to the social pressures embedded in digital environments. Supporting students' digital well-being therefore requires approaches that combine the development of technological competence with attention to self-esteem, social comparison, and the fear of being left behind.

Author Contributions

All authors contributed to the conception and design of the study, the interpretation of the results and the preparation of the manuscript. All authors read and approved the final manuscript.

Use of generative AI

During the preparation of this work, the authors used generative AI tools to assist with translation into English and to improve the language and readability of the manuscript. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethics approval and consent to participate

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (see Section 3.4). Participation was voluntary and anonymous, all participants were informed of the aims of the study and of their right to withdraw at any time, and informed consent was obtained before participation. As this was an anonymous, non-interventional questionnaire survey, formal approval from an ethics committee was not obtained.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical and confidentiality considerations.

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