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CYBERSECURITY RISKS IN ONLINE HIGHER EDUCATION: IMPLICATIONS FOR ACADEMIC STRESS

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ABSTRACT

The rapid expansion of online learning has significantly reshaped higher education across the globe. While digital platforms have improved access, flexibility, and continuity, they have also introduced new pressures for students. Academic stress in online environments has become increasingly visible, particularly as students navigate technological challenges, reduced face-to-face interaction, and greater expectations for independent learning. At the same time, growing reliance on digital systems has raised serious cybersecurity concerns, including data breaches, phishing attacks, identity theft, and privacy issues linked to remote proctoring technologies.

This review examines research published between 2020 and 2025 to explore how academic stress and cybersecurity concerns intersect within online higher education. Although both topics have been widely studied, they are often treated separately. By integrating psychological stress theories with cybersecurity perspectives, this review highlights how digital insecurity may function as an emerging academic stressor. The findings underscore the need for institutions to strengthen cybersecurity measures while also supporting students' psychological well-being in increasingly digital learning environments.

Keywords: academic stress, cybersecurity, online learning, higher education, digital privacy

INTRODUCTION

Over the past decade, higher education has undergone rapid digital transformation. Online learning, once supplementary, became central to university education worldwide, particularly following the COVID-19 shift to fully virtual platforms (O'Byrne et al., 2021; Aleshkovskiy et al., 2021). Students now rely extensively on digital platforms, video conferencing tools, and online assessment systems to complete their academic work.

While this transition has expanded access and flexibility, it has also reshaped students' academic experiences. Academic stress—defined as psychological strain arising when academic demands exceed coping capacity—has become increasingly evident in online settings. Students must manage unstable internet connections, limited instructor interaction, increased autonomy, and uncertainty in digital examinations (De la Fuente & Peralta-Sánchez, 2020; Gaur et al., 2020). Extended screen exposure and reduced social engagement have also been linked to anxiety and emotional fatigue (Komariah et al., 2022; AlJhani et al., 2022), suggesting that online learning may intensify traditional stressors.

At the same time, dependence on digital infrastructures has heightened cybersecurity concerns. Universities manage substantial volumes of sensitive student data, making them vulnerable to phishing, data breaches, identity theft, and privacy risks associated with remote proctoring systems (Anghel & Pereteanu, 2020; Tazi et al., 2023; Sadiqzade & Alisoy, 2025). These threats may affect not only institutional security but also students' perceptions of safety and control.

Although academic stress and cybersecurity challenges are widely discussed, they are typically examined separately. This review integrates psychological and cybersecurity perspectives to explore digital insecurity as a potential emerging academic stressor in online higher education.

CYBERSECURITY CONCERNS IN ONLINE EDUCATION

Cybersecurity concerns in online education can be explained through Protection Motivation Theory (Rogers, 1975), which suggests that perceived vulnerability to threats—such as data breaches or identity theft—can trigger fear and anxiety. In digital learning environments, these perceptions may influence students' emotional responses and sense of security.

The Technology Acceptance Model (Davis, 1989) further indicates that students' engagement with digital platforms depends partly on perceived security. When systems are viewed as intrusive or unsafe, particularly in surveillance-based proctoring contexts, trust may decline. Reduced trust can increase discomfort and resistance.

Technostress (Brod, 1984) also helps explain strain arising from technological complexity and uncertainty. Fear of hacking, system failure, or privacy invasion may intensify psychological pressure in digitally dependent settings. From an institutional perspective, Information Security Governance Theory highlights the importance

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of strong policies and transparent data protection practices. Weak governance may heighten perceptions of vulnerability and insecurity among students.

Together, these perspectives show that cybersecurity concerns are not solely technical matters but are closely tied to students' psychological experiences in online learning.

CONCEPTUAL LINK BETWEEN ACADEMIC STRESS & CYBERSECURITY CONCERNS

When considered together, these theories suggest that cybersecurity concerns may function as additional academic stressors in online learning environments. Within Lazarus & Folkman's (1984) framework, perceived digital threats can be appraised as environmental demands that intensify academic pressure. Similarly, the Demand–Control Model (Karasek, 1979) indicates that cybersecurity risks may increase perceived demands while reducing control. From the perspective of Conservation of Resources Theory (Hobfoll, 1989), fear of data loss or identity theft may represent a threat to personal and academic resources.

Taken together, digital insecurity can be understood as a potential psychological stressor that may compound academic stress in online higher education settings.

ACADEMIC STRESS IN ONLINE LEARNING

Academic stress can be understood using Lazarus & Folkman's (1984) Transactional Model of Stress and Coping. This model explains that stress happens when a person feels that the demands or pressures they face are more than their ability or resources to handle them.

Karasek's (1979) Demand–Control Model further suggests that stress increases when high demands are paired with low perceived control. Unstable internet connections, unfamiliar platforms, and remote assessments may reduce students' sense of control, amplifying stress responses.

Self-Regulated Learning Theory (Zimmerman, 2000) emphasizes students' capacity to manage their learning independently. Because online education requires strong self-discipline and time management, students with weaker regulatory skills may experience greater overload. Similarly, Conservation of Resources Theory (Hobfoll, 1989) explains stress as a reaction to perceived resource loss; reduced social interaction and academic support in online settings may contribute to emotional exhaustion.

Together, these frameworks suggest that academic stress in online learning is shaped by cognitive appraisal, perceived control, regulatory capacity, and resource preservation.

LITERATURE REVIEW

Sadiqzade and Alisoy (2025) studied cybersecurity risks in online education and found that phishing attacks, identity theft, and unauthorized access to data are some of the main threats affecting digital learning systems. The authors emphasized that the continued expansion of online education has increased institutional exposure to cyber vulnerabilities. Strengthened governance policies and awareness initiatives were recommended to protect student data and preserve trust in digital platforms.

Mahmood et al. (2024) examined cybersecurity countermeasures in higher education during crisis situations. Their study proposed adaptive governance frameworks aimed at enhancing institutional resilience against cyber threats. The findings suggested that proactive planning and continuous risk assessment significantly reduce vulnerability, reinforcing the importance of structured cybersecurity management in digitally dependent education systems.

Tazi et al. (2023) investigated privacy and cybersecurity concerns in online education environments. Students reported anxiety related to remote proctoring technologies, digital surveillance, and potential misuse of personal information. The study highlighted that perceived data insecurity contributed to emotional discomfort and distrust, suggesting that cybersecurity concerns may have direct psychological implications.

Saeed (2023) explored cybersecurity awareness and safety practices among university students. Although basic awareness was evident, many students struggled to consistently apply secure behaviors or identify phishing attempts. The study emphasized that limited cybersecurity literacy increases susceptibility to digital exploitation, underscoring the need for educational interventions.

Beyari & Alrusaini (2023) examined cybersecurity concerns within higher education platforms and found widespread apprehension regarding system reliability and data protection. Students indicated that unclear privacy policies reduced confidence in institutional systems. These findings suggest that perceived digital insecurity can influence students' emotional experiences in online learning contexts.

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Cheng & Wang (2022) analyzed institutional cybersecurity strategies and identified governance weaknesses that heightened exposure to cyber threats. Institutions lacking comprehensive digital security frameworks were more vulnerable to breaches and disruptions. The authors stressed that robust governance policies are critical for sustaining secure academic environments.

Komariah et al. (2022) investigated depression, anxiety, and stress among students engaged in prolonged online learning. Extended screen time, reduced physical activity, and limited peer interaction were associated with increased psychological strain. The study highlighted the cumulative emotional impact of sustained digital engagement.

AlJhani et al. (2022) examined mental health outcomes among medical students participating in extended online instruction. Elevated stress and anxiety were reported, particularly in relation to academic uncertainty and reduced clinical exposure. The findings underscored the importance of integrating psychological support into digital education systems.

O'Byrne et al. (2021) explored stress levels among medical students during the rapid transition to online learning. Heightened stress was linked to changes in assessment procedures and academic uncertainty. The study suggested that abrupt digital shifts can intensify academic pressure, particularly in demanding programs.

Chang et al. (2021) investigated the relationship between self-directed learning ability and emotional responses in online education. Students with weaker digital competence and lower self-regulation reported higher levels of stress and anxiety. These findings indicate that insufficient digital preparedness may contribute to academic strain.

Prieto et al. (2021) conducted a qualitative study examining students' lived experiences during pandemic-related online learning. Participants described emotional exhaustion, decreased motivation, and increased academic pressure associated with prolonged virtual engagement. Reduced face-to-face interaction contributed to feelings of isolation.

Alexei & Alexei (2021) analyzed cybersecurity threats in higher education following rapid digital implementation. Increased exposure to ransomware attacks, phishing schemes, and data breaches was identified. The study emphasized that expanding digital infrastructures without adequate security measures heightens institutional vulnerability.

Gaur et al. (2020) explored technological barriers in online classes and their impact on academic stress. Unstable internet connections, unclear communication, and limited faculty interaction significantly increased frustration and cognitive overload. These technological inefficiencies were identified as central contributors to stress in digital learning environments.

De la Fuente & Peralta-Sánchez (2020) examined the role of self-regulation in academic stress among undergraduate students. Poor regulatory skills were strongly associated with increased stress and academic exhaustion. As online learning demands greater autonomy, students lacking effective strategies experienced heightened strain.

Tus (2020) investigated the relationship between academic stress, motivation, and academic performance. Higher stress levels were linked to reduced motivation and lower academic achievement. Students under significant pressure reported difficulty concentrating and maintaining engagement, reinforcing the importance of stress management in academic contexts.

Overall, the reviewed studies indicate that online learning environments introduce both psychological and technological pressures. While academic stress research highlights autonomy demands and emotional strain, cybersecurity research emphasizes digital vulnerability and institutional risk. However, limited research directly examines how cybersecurity concerns may contribute to students' stress experiences, suggesting an important area for further exploration.

RESEARCH GAPS

Although academic stress and cybersecurity concerns are widely discussed, they are typically treated as separate areas of inquiry. Research on academic stress often focuses on workload, self-regulation, and emotional well-being, whereas cybersecurity studies emphasize technical protection and institutional governance. Few studies directly examine how students' perceptions of digital insecurity may influence academic stress in online environments. This gap limits a comprehensive understanding of students' lived experiences in digitally dependent higher education systems.

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Additionally, much of the current literature reflects emergency remote teaching during the COVID-19 pandemic. As online education becomes more integrated into long-term institutional strategies, further research is needed to examine sustained psychological and cybersecurity implications.

IMPLICATIONS

The findings of this review suggest that universities must adopt a more integrated approach to online learning. Academic stress cannot be addressed solely through workload management; concerns related to privacy, surveillance, and digital security must also be considered. Transparent communication regarding data protection policies may help strengthen students' trust in digital systems.

At the same time, institutions should invest in robust cybersecurity frameworks and provide students with basic digital safety training. Combining strong technical safeguards with accessible mental health support can help create online learning environments that are both secure and psychologically supportive.

CONCLUSION

Online learning has become central to higher education, offering flexibility and broader access. However, digital learning environments can increase academic stress due to greater autonomy, technological barriers, and reduced social interaction. At the same time, reliance on online platforms has heightened cybersecurity concerns, including data breaches, phishing, and privacy risks linked to digital surveillance.

Although academic stress and cybersecurity challenges are often studied separately, they may be closely connected. Concerns about digital security can affect students' sense of safety and control, potentially intensifying academic pressure. Recognizing digital insecurity as a potential stressor allows for a more comprehensive understanding of students' online learning experiences.

These insights align with Sustainable Development Goal 4 (Quality Education), which emphasizes safe and supportive learning environments. Strengthening cybersecurity while protecting students' psychological well-being is essential for developing sustainable and trustworthy digital education systems.

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