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The Strong Connection Between Anxiety, Stress, and Digitalization in Education

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Abstract

This study explores the complex relationship between anxiety, stress, and the digitalization of education among students. The transition to online learning and the increasing reliance on digital tools have intensified the challenges students face in adapting to new educational technologies. The demands for constant connectivity, the overwhelming amount of information, and the need to navigate digital platforms contribute to heightened stress and anxiety. Additionally, the reduction in face-to-face interactions and the prevalence of social comparison on digital platforms have further exacerbated mental health issues. This review synthesizes existing research on the impacts of digital education, emphasizing the need for strategies that address students' psychological well-being. By understanding the factors that contribute to anxiety and stress, educators can create more supportive digital learning environments, promoting both academic success and mental health.

Keywords: *Anxiety, Digital Learning Platforms, Digitalization, Education, Mental Health, Online Learning, Stress, Student Well-being, Technostress*

Introduction

The digitalization of education, including the widespread use of digital devices and online learning platforms, has significantly increased the demands placed on students. Students are now required to stay connected and complete assignments on time [1], [2], which can create pressure and contribute to anxiety and stress. This pressure is particularly challenging for students who are not accustomed to or struggle with technology. As a result, the transition to digital education may be overwhelming for those who find the technological demands difficult to manage.

Another factor that contributes to the anxiety and stress in students is the overwhelming amount of information they are exposed to through digital platforms. While digitalization allows for easy access to vast amounts of information, this can lead to "infoxication," where students struggle to differentiate between relevant and useful information [3], [4]. This excess of information can cause confusion and anxiety, making it harder for students to focus and make informed decisions about their learning. Furthermore, students who rely heavily on technology for their education may experience

increased stress if technical issues, such as poor internet connectivity or malfunctioning devices, arise, especially during high-pressure situations like exams or assignment deadlines.

Digital education also affects students' social interactions, which can contribute to higher levels of stress. With more learning taking place online, face-to-face interactions between students and teachers, as well as peer collaboration, are significantly reduced [5], [6], [7]. This lack of social engagement can lead to feelings of loneliness, social anxiety, and a reduced ability to collaborate effectively with others, all of which can further intensify academic stress. Additionally, social media and digital platforms can exacerbate anxiety through social comparison, as students may feel inadequate when comparing themselves to peers who appear more successful or proficient with technology. The blurring of boundaries between study time and personal time due to constant exposure to digital devices can also reduce students' opportunities for rest and recreation, leading to burnout and increased stress. While digitalization offers flexible learning opportunities and access to valuable resources [8], it is crucial to maintain a balance and provide sufficient support to help students manage the potential mental health challenges that arise from these new learning environments.

The rapid digitalization of education, especially accelerated by the shift to online learning during the COVID-19 pandemic, has significantly transformed how students engage with their academic work. Research has consistently shown a strong connection between anxiety, stress, and digitalization in education, highlighting the challenges faced by students in this new learning environment. A systematic review of existing studies reveals that the transition to distance learning led to decreased academic satisfaction, competence, and engagement, particularly among students who experienced higher levels of anxiety and negative emotions [9]. Similarly, a study in Spain identified technostress as a key factor negatively impacting students' well-being, with a notable relationship between user type and techno-anxiety [10]. Furthermore, research from Peru demonstrated a significant correlation between anxiety and stress in virtual education during the COVID-19 emergency, which was linked to hindrances in students' competency development [11]. These findings underscore the importance of addressing mental health concerns in digital education settings. This systematic review aims to synthesize existing research on the relationship between anxiety, stress, and digitalization in education, offering a comprehensive understanding of how these factors impact students' academic experiences and well-being. This study aims to provide valuable insights that can guide future strategies for mitigating the adverse effects of digital learning environments on students' mental health.

Materials and Methods

This study employs a systematic review approach to examine the relationship between anxiety, stress, and digitalization in education. A comprehensive search of relevant literature was conducted across multiple academic databases, including Google Scholar, PubMed, and Scopus. The search terms included combinations of keywords such as "anxiety," "stress," "digitalization," "education," "online learning," and "technostress." Studies published in peer-reviewed journals exploring digitalization's impacts on students' mental health and academic experiences were considered for inclusion.

Inclusion criteria for the studies were as follows: (1) empirical research focusing on students in various educational contexts, (2) studies that investigated anxiety and stress as outcomes of digital

education or online learning, and (3) studies published in English. Exclusion criteria included studies that did not focus on student populations, those that did not specifically address digital learning environments, and studies without clear methodological rigor.

Data from selected studies were extracted and synthesized to identify common themes and patterns. The findings were categorized into three main themes: the impact of digitalization on academic engagement and well-being, the role of technostress in exacerbating anxiety and stress, and the various factors influencing students' mental health in virtual education settings. A narrative synthesis approach was used to integrate the results and provide a comprehensive overview of the current understanding of how digitalization in education influences student anxiety and stress.

Results and Discussion

Based on the findings from various studies, the results can be grouped into three major themes: Impact of Digitalization on Academic Engagement and Well-Being, Technostress and its Effects on Mental Health, and Factors Influencing Anxiety and Stress in Virtual Education.

A. Impact of Digitalization on Academic Engagement and Well-Being

The shift to digital education has significantly decreased academic satisfaction, subjective competence, and student engagement, often accompanied by moderate learning difficulties. Students who experienced heightened anxiety, negative emotions, and concerns about online privacy and security faced more substantial academic challenges. Those with lower levels of positive emotions, greater amotivation, and anxiety about transitioning to online learning experienced the most pronounced declines in academic satisfaction and engagement [9].

Additionally, the digitalization of education has negatively impacted students' physical and psychological health. Prolonged online learning led to fatigue, affective disorders, and reduced motivation, which contributed to behavioral changes and declining academic performance [12]. The lack of social interaction and difficulties adapting to digital platforms further exacerbated these issues, making it challenging for students to balance academic responsibilities with personal well-being [13].

Moreover, many students reported medium to high vulnerability to stress, driven by inadequate learning environments, including poor internet connectivity, unsuitable study spaces, and challenges inherent in remote learning. These stressors, coupled with heightened anxiety about navigating digital education, significantly hindered academic success and mental health [10], [14].

In summary, the rapid transition to digital education has led to notable declines in academic satisfaction, engagement, and mental health, driven by increased anxiety, learning difficulties, and environmental stressors.

B. Technostress and Its Effects on Mental Health

Technostress, encompassing factors such as techno-overload, techno-insecurity, and techno-invasion, has been shown to significantly impact students' mental health, particularly in relation to anxiety disorders. Research on Brazilian students revealed that these stressors exacerbated anxiety levels, with gender and employment status influencing the severity of technostress. Female students and those with unstable employment were more susceptible to higher levels of technostress, highlighting the importance of personal circumstances in shaping experiences of digital education [10], [14].

Technostress also correlates strongly with negative outcomes at individual, group, and professional levels, with the most severe effects observed in individual well-being. Although the overall level of technostress was not directly linked to specific social media use archetypes, students with personality traits such as discrepancy and narcissism were especially prone to techno-anxiety. This indicates that personality traits may influence how students experience and manage the challenges of digital education [10].

Additionally, the transition to distance learning increased neuropsychological strain, leading to heightened anxiety, lower mood, and reduced activity levels among students. The challenges of navigating online learning environments contributed to greater stress and made it more difficult for students to balance academic demands with personal well-being. The cumulative neuropsychic load during prolonged online education highlights the urgent need for support systems to help students manage the complexities of digital learning [12], [13].

In summary, technostress and its associated neuropsychic strain pose significant challenges to students' mental health and well-being, necessitating tailored interventions to mitigate their impact.

C. Factors Influencing Anxiety and Stress in Virtual Education

A significant percentage of students experienced both anxiety and stress during virtual education. These emotional challenges were not solely the result of academic pressures but were also influenced by external factors such as health concerns and social distancing. These stressors emphasize the need for preventive mental health measures to support students in digital learning environments and mitigate the emotional toll of online education [9], [15].

The stress associated with distance learning was closely linked to heightened uncertainty about the future, with many students worrying about the suspension of academic activities and their long-term effects. Specific groups of students faced additional barriers, such as difficulty accessing suitable learning environments, reliable internet connections, and quiet study spaces, which exacerbated their stress levels. These factors compounded the challenges of adapting to virtual education, underscoring the critical need for improved access to resources and support systems [13], [14], [16].

Research highlighted the pivotal role of students' coping strategies in managing anxiety and stress. Self-control was identified as the most effective strategy for reducing the negative effects of digital learning. Students with stronger self-regulation skills experienced significantly lower levels of stress and anxiety, suggesting that fostering these skills can help students manage the pressures of online education and maintain their mental well-being [10], [17].

In summary, addressing stress and anxiety in virtual education requires a multifaceted approach, including mental health interventions, resource accessibility improvements, and the promotion of self-regulation strategies.

Conclusion

This systematic review highlights the significant relationship between anxiety, stress, and digitalization in education, emphasizing the challenges faced by students in adapting to online learning environments. The findings indicate that while digital education offers flexibility and access to resources, it also introduces new stressors such as technostress, academic pressures, and external factors like

social isolation and health concerns. Students with higher levels of anxiety, negative emotions, and insecurity regarding technology were particularly vulnerable to decreased academic satisfaction, lower engagement, and deteriorating mental health. The review underscores the need for proactive measures to support students in managing these challenges. Coping strategies, particularly self-regulation and effective stress management techniques, are crucial in mitigating the negative effects of digital learning. Institutions should prioritize mental health support and ensure that students have access to adequate learning environments, including reliable technology and quiet study spaces. By addressing the psychological and emotional aspects of digital education, educators can create more inclusive and supportive online learning experiences that foster both academic success and mental well-being.

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