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Research Article

Online learning adaptation during Covid-19 psychological impacts on Chinese students

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ABSTRACT

The COVID-19 pandemic necessitated a rapid shift to online learning, profoundly affecting students' psychological well-being. This study investigates the psychological impacts of online learning adaptation among 100 Chinese students, focusing on depression, anxiety, and stress levels. Data were collected through a structured questionnaire, and statistical analyses, including correlation and regression, were employed to identify key stressors and predictors of mental health outcomes. Results indicate that 25%, 20%, and 30% of students experienced severe or extreme depression, anxiety, and stress, respectively. Major challenges included digital fatigue, academic pressure, and social isolation, with rural students reporting higher isolation levels. Coping mechanisms such as relaxation techniques and structured schedules were effective in mitigating stress. The findings emphasize the need for mental health support, equitable access to resources, and interactive online learning environments to enhance student resilience during crises.

Key words: Online learning, psychological impacts, depression, anxiety, stress, COVID-19, Chinese students, digital fatigue, academic pressure, social isolation, coping mechanisms.

Introduction

The impact of Covid-19 on education

The COVID-19 pandemic disrupted education systems worldwide (d'Orville, 2020), forcing institutions to adopt online learning as an emergency response to lockdowns and physical distancing measures. For students across China, this abrupt shift transformed their educational experience. As schools and universities closed their doors, digital platforms became the lifeline for academic continuity (Abas et al., 2022). While online learning ensured uninterrupted education, it also presented unique challenges that deeply affected the psychological well-being of students.

The rise of online learning in China

China's educational landscape quickly adapted to the crisis, leveraging advanced technology and existing digital infrastructure (Luo, 2022). Platforms like Tencent Classroom, DingTalk, and Zoom became central to delivering lectures, conducting discussions, and assigning tasks. The swift adoption of online learning reflected the resilience of the system (AlQashouti et al., 2024); however, it also revealed gaps in preparedness and the unequal access to resources. For many students, navigating this new digital environment was a daunting task, exacerbating stress and anxiety during an already uncertain time.

Challenges beyond academics

Online learning introduced a host of challenges that extended beyond academic performance (Yang & Farley, 2024). Social isolation became a significant concern, as students were cut off from their peers and educators. The lack of in-person interaction not only hindered collaborative learning but also affected students' emotional well-being (Kalmar et al., 2022). The shift to a solitary learning environment created feelings of loneliness and disconnection, especially for students accustomed to engaging with classmates in traditional classrooms.
In addition, many students faced digital fatigue due to prolonged screen time. Sitting through hours of virtual classes took a toll on their physical and mental health, leading to symptoms like eye strain, headaches, and

decreased motivation (Hagedorn et al., 2022). This new mode of learning also imposed greater responsibility on students to manage their schedules and remain self-disciplined, adding to their psychological burden.

Inequalities in access

The digital divide further complicated the transition. Students from rural or economically disadvantaged backgrounds often struggled with unreliable internet connections and limited access to devices (Freeman et al., 2020). These disparities created an uneven playing field, leaving many students feeling frustrated and marginalized. For such students, the stress of falling behind academically compounded their psychological distress, emphasizing the urgent need for equitable solutions in education.

The intersection of culture and pressure

In China, the cultural emphasis on academic excellence added another layer of complexity (Sue & Okazaki, 2022). Students were expected to maintain high standards despite the challenges of adapting to online learning. The combination of technological hurdles, academic pressure, and the uncertainties brought by the pandemic created a stressful environment that had lasting effects on their mental health (Manchia et al., 2022).

The need to address psychological impacts

This study examines the psychological impacts of the rapid shift to online learning on Chinese students during the COVID-19 pandemic. By exploring the challenges they faced and the coping strategies employed, the article sheds light on the importance of mental health support and equitable access to resources in times of crisis. The findings aim to inform policies and practices that can better support students in navigating future disruptions, ensuring that education systems prioritize both academic success and psychological well-being.

Methodology

Research design

This study employed a descriptive cross-sectional design to investigate the psychological impacts of online learning adaptation during the COVID-19 pandemic among Chinese students. The research aimed to identify the key stressors, coping mechanisms, and overall psychological well-being of students during this transitional period.

Sample size and sampling technique

The study utilized a sample of 100 students drawn from various educational institutions across China. To ensure diverse representation, a purposive sampling method was applied, capturing participants from both urban and rural areas, as well as different academic levels, including secondary, undergraduate, and postgraduate students.

Data collection tools

A structured questionnaire was developed to collect data on students' experiences and psychological well-being. The questionnaire comprised sections on demographic information, psychological health, online learning challenges, social isolation, and coping mechanisms. The Depression, Anxiety, and Stress Scale (DASS-21) was used to assess mental health, while other questions addressed challenges like digital fatigue, technical issues, and academic pressure. Additional sections explored the impact of social isolation and strategies adopted by students to manage stress, including peer interactions, relaxation techniques, and institutional support.

Data collection procedure

Given the restrictions imposed by the pandemic, data collection was conducted online using platforms such as WeChat, DingTalk, and email. Students were invited to participate voluntarily, and informed consent was obtained before they completed the questionnaire. Confidentiality was strictly maintained throughout the process, ensuring participants' anonymity and secure handling of their responses.

Parameters measured

Several key parameters were measured to evaluate the psychological effects of online learning. These included the levels of depression, anxiety, and stress as assessed by DASS-21; the frequency of technical challenges and digital fatigue; the impact of social isolation; access to online learning resources; and the effectiveness of various coping mechanisms employed by students.

Statistical analysis

The collected data were analyzed using SPSS software to ensure accurate and robust results. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarize demographic details and study parameters. Pearson’s correlation analysis was performed to examine relationships between stress levels and factors such as digital fatigue, academic pressure, and social isolation. Independent samples t-tests compared psychological well-being scores between urban and rural students, while multiple linear regression identified predictors of stress, anxiety, and depression. Additionally, qualitative data from open-ended responses on coping strategies were thematically analyzed to uncover common patterns and insights.

Ethical considerations

The study adhered to ethical guidelines to ensure the protection of participants. Students were informed about the study's purpose and their rights, including the option to withdraw at any time. Ethical approval was obtained from the relevant institutional review board, and all data were kept confidential to safeguard participants' privacy.

By employing this comprehensive methodology, the study aimed to capture a nuanced understanding of the psychological challenges faced by Chinese students during the pandemic-induced transition to online learning and to identify actionable strategies for mitigating these impacts.

Results

Table 1: Demographic characteristics of participants

Demographic Variables	Statistics
Gender (Female/Male)	60% / 40%
Academic Level	70% UG, 20% Secondary, 10% PG
Location (Urban/Rural)	55% / 45%
Age (Mean ± SD)	20.5 ± 2.8
Internet Access (Reliable/Unreliable)	80% / 20%
Device Availability	90% Smartphone, 70% Laptop, 50% Desktop

The study provided significant insights into the psychological impacts of online learning adaptation during the COVID-19 pandemic among Chinese students. The demographic characteristics of the participants (Table 1) showed that the majority were undergraduates (70%), with a mean age of 20.5 years (SD = 2.8). The gender distribution was 60% female and 40% male, and 55% of the participants were from urban areas while 45% were from rural areas. Reliable internet access was reported by 80% of the students, with most accessing online learning via smartphones (90%) and laptops (70%).

Table 2: Levels of depression, anxiety, and stress (DASS-21 scores)

DASS-21 Parameters	Mean Score (± SD)	Severity Level	Students Reporting Severe or Extreme Levels
Depression	16.8 ± 5.2	Moderate	25%
Anxiety	14.3 ± 4.7	Moderate	20%
Stress	18.1 ± 5.5	Moderate	30%

The psychological well-being of students, measured using the DASS-21 scale (Table 2), indicated moderate levels of depression (mean score: 16.8 ± 5.2), anxiety (mean score: 14.3 ± 4.7), and stress (mean score: 18.1 ± 5.5). Approximately 25%, 20%, and 30% of students reported severe or extreme levels of depression, anxiety, and stress, respectively, underscoring the substantial mental health burden faced by students during this period.

Table 3: Challenges in online learning

Challenges	Percentage of Students Reporting	Severity (Low/Moderate/High)
Technical Difficulties	68%	High
Digital Fatigue	75%	High
Academic Pressure	80%	High
Difficulty in Maintaining Focus	65%	Moderate
Lack of Motivation	60%	Moderate

Table 3 highlights the challenges encountered by students in online learning. Technical difficulties, such as unstable internet connections, were reported by 68% of participants, while 75% experienced digital fatigue, manifesting as physical and mental exhaustion. Academic pressure was cited as a major stressor by 80% of the students, with additional challenges including difficulty in maintaining focus (65%) and a lack of motivation (60%). These findings emphasize the multifaceted stressors impacting students' ability to adapt to online learning.

Table 4: Social Isolation and Support

Group	Mean Social Isolation Score (± SD)	Percentage Reporting High Isolation	Significance (t-test p-value)
Urban Students	12.5 ± 3.2	40%	-
Rural Students	14.1 ± 3.7	55%	0.015

Social isolation was another significant factor affecting psychological well-being (Table 4). Rural students reported higher levels of social isolation (mean score: 14.1 ± 3.7) compared to their urban counterparts (mean score: 12.5 ± 3.2), with a significant difference observed (t-test p-value = 0.015). Additionally, 55% of rural students reported high levels of isolation, compared to 40% of urban students.

Table 5: Correlation between Psychological Well-being and Online Learning Challenges

Psychological Parameter	Digital Fatigue (r)	Academic Pressure (r)	Social Isolation (r)	Focus Challenges (r)
Depression	0.62***	0.58***	-	0.45**
Anxiety	-	-	0.52***	0.38**
Stress	0.39***	0.64***	0.28**	0.50**

The correlation analysis presented in Table 5 revealed strong positive relationships between psychological parameters and online learning challenges. Depression was significantly correlated with digital fatigue ($r = 0.62$, $p < 0.001$) and academic pressure ($r = 0.58$, $p < 0.001$), while anxiety showed a significant correlation with social isolation ($r = 0.52$, $p < 0.001$). Stress was strongly correlated with all key challenges, including academic pressure ($r = 0.64$, $p < 0.001$), digital fatigue ($r = 0.39$, $p < 0.001$), and difficulty maintaining focus ($r = 0.50$, $p < 0.001$).

Table 6: Regression Analysis Predicting Stress Levels

Predictors	Beta Coefficient (β)	Significance (p-value)
Academic Pressure	0.45	< 0.001
Digital Fatigue	0.39	< 0.001
Social Isolation	0.28	0.002
Difficulty in Maintaining Focus	0.35	0.004
Lack of Motivation	0.22	0.01

Table 6 summarizes the results of the regression analysis predicting stress levels. Academic pressure ($\beta = 0.45$, $p < 0.001$) and digital fatigue ($\beta = 0.39$, $p < 0.001$) were the strongest predictors of stress, followed by social isolation ($\beta = 0.28$, $p = 0.002$) and difficulty maintaining focus ($\beta = 0.35$, $p = 0.004$). These predictors collectively explained a significant portion of the variance in stress levels among students.

Table 7: Coping Mechanisms and Their Effectiveness

Coping Mechanisms	Percentage of Students Using	Effectiveness (Mean Stress Reduction ± SD)
Relaxation Techniques	58%	15.2 ± 4.8
Peer Interactions	47%	-
Online Counseling Services	30%	-
Structured Study Schedules	40%	14.5 ± 5.0
Family Support	55%	-
Physical Exercise	35%	13.8 ± 4.5

Finally, Table 7 outlines the coping mechanisms adopted by students and their effectiveness. Relaxation techniques were the most common (58%) and effective, leading to a mean stress reduction of 15.2 ± 4.8. Other strategies included peer interactions (47%), structured study schedules (40%), and physical exercise (35%). Family support (55%) also played a vital role in providing emotional stability, though its impact on stress reduction was not directly quantified.

Discussion

Psychological impacts of online learning

The findings of this study reveal significant psychological challenges faced by Chinese students during the shift to online learning, highlighting the prevalence of moderate to severe levels of depression, anxiety, and stress (Table 2). The heightened mental health burden can be attributed to the abrupt transition to online platforms,

which disrupted traditional learning environments and imposed additional demands on students (Oliveira et al., 2021). These results align with existing literature suggesting that uncertainty and isolation during the pandemic exacerbated mental health concerns among students globally (Smith et al., 2020; Salimi et al., 2023).

The role of online learning challenges

Technical difficulties, digital fatigue, and academic pressure emerged as the primary stressors in this study (Table 3). The high prevalence of digital fatigue (75%) reflects the adverse effects of prolonged screen time, such as eye strain and mental exhaustion, which were exacerbated by the lack of structured breaks in online classes. Academic pressure, reported by 80% of participants, further intensified stress levels, as students struggled to adapt to new modes of assessment and self-directed learning. These findings underscore the need for educators to develop strategies that reduce cognitive overload and provide clearer guidelines for online coursework (Chew & Cerbin, 2021).

Social isolation and its consequences

Social isolation was another significant contributor to students' psychological distress, with rural students reporting higher levels of isolation compared to their urban counterparts (Table 4). This disparity may be attributed to the limited access to peer networks and institutional support in rural areas. The strong correlation between social isolation and anxiety ($r = 0.52$, $p < 0.001$; Table 5) suggests that fostering a sense of community in online learning environments could mitigate feelings of loneliness and improve mental health outcomes (Bhat et al., 2024). Initiatives such as virtual study groups and discussion forums can play a crucial role in maintaining social connections (Frangieh et al., 2024).

Predictors of Stress

Regression analysis identified academic pressure, digital fatigue, and social isolation as the strongest predictors of stress (Table 6). These results emphasize the multifaceted nature of stressors in online learning, where technical, social, and academic factors collectively influence students' well-being. Difficulty maintaining focus ($\beta = 0.35$, $p = 0.004$) also emerged as a notable predictor, highlighting the importance of promoting active engagement in virtual classrooms (Pourabedin & Biglari, 2024). Educators can address these issues by incorporating interactive teaching methods and providing regular feedback to maintain student attention.

Effectiveness of coping mechanisms

Students employed various coping strategies to manage stress, with relaxation techniques being the most commonly used and effective method (Table 7). Structured study schedules and physical exercise also contributed to stress reduction, demonstrating the importance of fostering healthy routines during remote learning. Family support, reported by 55% of participants, played a vital role in providing emotional stability, particularly for students facing high levels of social isolation. These findings suggest that both individual and systemic interventions are necessary to support students' mental health during similar crises (Capurso et al., 2022).

Implications for policy and practice

The results of this study highlight the need for comprehensive mental health support systems in educational institutions. Schools and universities should prioritize mental health services, including online counseling and stress management workshops, to address the psychological impacts of online learning. Additionally, bridging the digital divide is essential to ensure equitable access to online education, particularly for students in rural areas. Policymakers must invest in infrastructure and provide subsidies for internet and device access to mitigate the challenges identified in this study.

Limitations and future research

While this study provides valuable insights into the psychological impacts of online learning, certain limitations must be acknowledged. The use of a purposive sample may limit the generalizability of the findings, and self-reported data could introduce bias. Future research should consider larger, more representative samples and longitudinal designs to explore the long-term effects of online learning on mental health. Investigating the role of cultural factors and individual differences in coping strategies could further enrich our understanding of this complex issue.

Conclusion

This study highlights the significant psychological impacts of the transition to online learning during the COVID-19 pandemic on Chinese students. The findings reveal that moderate to severe levels of depression, anxiety, and stress were prevalent, driven by challenges such as digital fatigue, academic pressure, and social isolation. Rural students faced additional burdens due to higher levels of isolation and limited access to resources, underscoring the importance of addressing educational inequities. Coping mechanisms like relaxation techniques, structured schedules, and family support proved effective in mitigating stress, but systemic interventions are needed to enhance their accessibility and impact.

The results emphasize the necessity for educational institutions and policymakers to prioritize mental health support, improve digital infrastructure, and foster interactive and inclusive online learning environments. While this study provides valuable insights, further research is needed to explore long-term effects and develop tailored strategies that enhance the resilience and well-being of students in similar crises. Addressing these challenges will be crucial for building a more adaptive and equitable education system in the post-pandemic era.

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