Time management of technology use and symptoms of mental disorders in students.

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ABSTRACT

The rise of the use of technology among students has raised new challenges in time management, which has the potential to affect mental health. Symptoms of mental disorders, such as stress, anxiety, and depression, are increasingly reported as the intensity of technology use in academic environments increases. This study aims to analyze the relationship between the management of time using technology and the symptoms of mental disorders in students. This study uses a mixed methods design, which combines quantitative and qualitative approaches to obtain a comprehensive picture. Data collection was carried out through questionnaires that were distributed to a sample of active students from several study programs with purposive sampling techniques based on certain criteria, such as semester level and intensity of technology use. In addition, interviews were conducted with some of the respondents, as many as 100 selected respondents, to explore their experiences and time management strategies in the face of academic pressure. The results showed that students with good technology time management tended to have lower levels of stress and anxiety compared to those with less effective time management. The main factors that affect are the ability to set priorities, limit screen time, and social support from the campus environment. Qualitative findings also revealed that students who are able to consistently apply time management techniques are more resilient to academic and social pressures. In conclusion, time management of the use of technology plays a significant role in suppressing the symptoms of mental disorders in students. The implications of this study emphasize the importance of campus interventions in the form of time management training and mental health promotion to create a healthier and more productive learning environment.

I. INTRODUCTION

Time management of technology use has a role in maintaining a balance between academic activities and the use of digital devices among students. With effective time management, students can set priorities, manage distractions from

gadgets, and avoid excessive use of technology so that they can increase productivity and reduce stress and anxiety that often arise due to academic pressure and social demands. On the contrary, the use of technology without good timing has the potential to lead to mental disorders such as sleep disorders, anxiety, and depression, caused by excessive screen exposure, social media pressure, and dependence on gadgets(König, 2019). Therefore, good time management not only assists students in completing assignments and studies efficiently but also contributes to improved mental health and overall well-being, as well as boosts their adaptability to academic and social challenges in today's digital age(Ademoyegun et al., 2024).

Students in the digital era today experience problems in managing the time of using technology, especially in the midst of increasingly complex academic demands and almost unlimited exposure to digital devices(Radovic et al., 2022). The reality on the ground shows that the excessive use of technology, such as smartphones and social media, has triggered various symptoms of mental disorders in college students, ranging from stress, anxiety, insomnia, to academic burnout(Bolinski et al., 2022). However, not all students who use technology intensely experience mental disorders, and some actually feel helped in regulating their academic activities through technology, so the negative side of using this technology has not been fully understood.

It is not yet known for sure, for example, whether good time management in the use of technology is really able to suppress the symptoms of mental disorders, or whether students with good time management skills are still at risk of experiencing stress due to other external factors, such as workload and the social environment. Some studies have even found the opposite results, where the optimal use of technology can improve learning and communication efficiency, but at the same time cause distractions and addictions that negatively impact students' mental health. This shows the existence of a paradox in the use of technology in the academic environment. Thus, there are still many aspects that have not been revealed regarding the relationship between the time management of technology use and the symptoms of mental disorders in students, such as the role of mediating factors (e.g., sleep quality, social support, or self-regulation) and the extent to which certain types of technology (social media, games, learning applications) contribute to the onset of mental disorders. The reality that has not been realized is that no campus intervention or program specifically targets improving time management skills in the use of technology to reduce the risk of mental disorders among students.

The novelty lies in an integrative approach that not only measures the relationship between time management and mental disorders but also explores the contextual factors that strengthen or weaken those relationships, and offers recommendations for interventions based on empirical data. This study also combines mixed methods to get a more comprehensive picture, both from the quantitative and qualitative sides. Effective time management in the use of technology can be a protective factor against the symptoms of mental disorders, but its effects may be greatly influenced by individual and environmental factors.

This study also seeks to identify the most effective time management strategies for students in the context of daily technology use.

The purpose of this study is to analyze the relationship between technology time management and the symptoms of mental disorders in college students, as well as to identify the factors that mediate or moderate these relationships. With a fairly clear gap between this study and the previous research. For example, a study by Niarotul Anjumi (2023) entitled "The Relationship Between Time Management and Academic Anxiety in Students at the Darussa'adah KH. Islamic Boarding School. Asyikin Bandar Lampung" only examines the relationship between time management and academic anxiety without considering the specific role of technology use and other types of mental disorders such as stress or insomnia(Chowdhury et al., 2024).

Another study by Anindya Rafa Azzahrah & Zahrotul Uyun (2023) entitled "The Effect of Time Management and Intensity of Social Media Use on Academic Procrastination in Students of the Faculty of Psychology, University of Muhammadiyah Surakarta" focuses more on academic procrastination and social media, but has not been directly associated with a wider spectrum of mental disorders. This research is here to fill this gap by looking holistically at the relationship between technology time management and various symptoms of mental disorders in students(Knihs de Camargo et al., 2024).

II. METHODOLOGY

This study uses a mixed methods approach, which combines quantitative and qualitative methods integratively to obtain a comprehensive picture to determine the relationship between the management of time to use technology and the symptoms of mental disorders among students. The research design used is an explanatory sequential design, where research begins with quantitative data collection and analysis, then continues with qualitative data collection to deepen and explain quantitative findings. This approach was chosen because it was able to capture both statistical relationship patterns and subjective experiences of students related to the use of technology and its impact on mental health(Schoonenboom & Johnson, 2017).

The population in this study is active students, with inclusion criteria such as students who actively use digital technology (smartphones, laptops, social media, learning applications) in daily academic and social activities. Samples were taken using stratified random sampling techniques to ensure representation from different faculties and batches, with the sample count adjusted based on the Slovin formula or the Krejcie & Morgan table. Stratified random sampling is used at the stage of taking quantitative survey respondents. This technique was chosen so that the sample taken could represent the diversity of students from various faculties and generations. By dividing the student population into strata based on faculty and cohort years, researchers ensured that each group was proportionally represented in the survey. This is important to obtain a more accurate picture of the relationship between technology time management and symptoms of mental disorders across campuses, as well as to minimize the bias that may arise if only one particular group is used.

Meanwhile, purposive sampling was applied at the stage of selecting subjects for qualitative interviews. This technique is used to select participants who have special characteristics that are relevant to the research objectives, for example, students with low time management scores and high symptoms of mental disorders, and vice versa. With purposive sampling, researchers can delve deeper into the experiences, strategies, and challenges faced by the group of students who are considered the most representative in the context of the problem being studied. This purposive selection of subjects also allows researchers to obtain richer and more in-depth qualitative data, so that they can complement the findings of quantitative data.

The combination of these two sampling techniques not only increases the validity of the research results but also provides a more comprehensive understanding of the dynamics of time management of technology use and its impact on students' mental health. This approach ensures that both quantitative and qualitative data obtained truly reflect real conditions on the ground and are relevant for the development of interventions in the campus environment. For the research subjects, purposive sampling was selected from quantitative survey participants who met certain criteria, such as students with low time management scores and high symptoms of mental disorders, and vice versa, as many as 12 people for interviews.

Research instruments at the quantitative stage are in the form of standardized questionnaires or questionnaires, such as the Technology Use Time Management Scale (which measures aspects of planning, prioritization, and control of technology use) and mental disorder symptom scales such as the Depression Anxiety Stress Scales (DASS-21) or the General Health Questionnaire (GHQ-12). The instrument used is a semi-structured interview guide that explores students' experiences, perceptions, strategies, and challenges in managing their time using technology and its impact on their mental health(McCann, 1998). The research procedure with this mixed method includes several steps. First, the researcher conducted a quantitative survey by distributing questionnaires online or offline to a predetermined sample of students. The collected quantitative data is then analyzed using descriptive and inferential statistics, such as correlation or regression tests, to see the relationship between technology time management and symptoms of mental disorders.

Based on the survey results, the researcher selected the subjects for the qualitative stage and conducted interviews in order to further explore the factors that influence the relationship, including the mediating or moderating role of other variables such as sleep quality, social support, or self-regulation. Third, qualitative data is analyzed with thematic analysis techniques to find patterns of new findings or strengthen quantitative results. Finally, the researcher integrates the results of the two stages to draw comprehensive conclusions and provide recommendations for interventions based on empirical data, such as training programs on the time management of technology use on campus(McCann, 1998).

III. RESULTS AND DISCUSSION.

The results of this study show that out of 100 student respondents who participated, it was found that the average time spent using digital devices reached 7.8 hours per day, with the largest proportion used for academic purposes (42%) and social media (35%), and the rest for entertainment and other needs. Statistical analysis using SmartPLS showed that poor time management in the use of technology was positively and significantly correlated with increased symptoms of stress, anxiety, and depression. The results of statistical analysis showed a significant relationship between time management and symptoms of mental disorders, which was reinforced by the interview findings that students with effective time management strategies tended to be better able to cope with academic and social pressure. An R^2 value of 0.683 indicates that 68.3% of the variation in symptoms of mental disorders in college students can be explained by the variable management of the time of technology use. In more detail, excessive use of social media has the largest contribution to anxiety, while the use of technology for digital entertainment is more related to symptoms of depression. Meanwhile, the use of technology for academic purposes did not show a significant relationship with the symptoms of mental disorders if students had good time management.

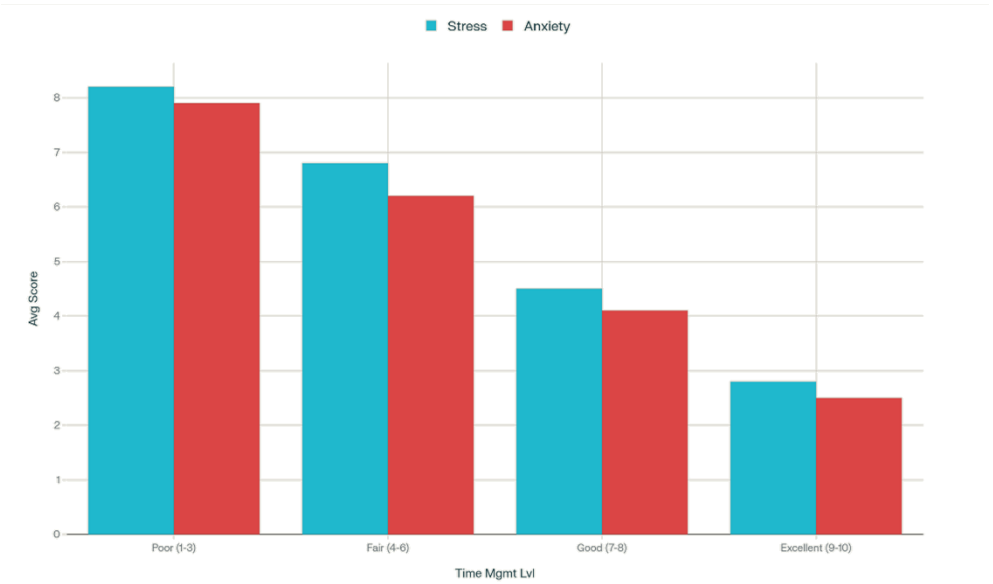


Figure 1. Time Mgmt vs Stress and Anxiety

The results showed that college students with poor time management levels (scores 1-3) had an average stress level of 8.2 and anxiety of 7.9 out of a scale of 10. In contrast, students with excellent time management (score 9-10) experienced only a 2.8 stress level and Daily Technology Usage Anxiety Analysis of technology usage patterns showed interesting variations in students' time allocation to different types of technology applications. Social media dominates daily usage with an average of 3.2 hours per day.

Interviews conducted with 12 college students revealed that effective time management strategies, such as limiting time using social media and using timer apps, helped them reduce distractions and improve their focus on studying. In contrast, college students who are unable to manage their time using technology tend to experience a negative cycle, where academic pressure pushes them to overuse social media or digital entertainment as an escape, which ultimately exacerbates stress and anxiety. In addition, sleep quality emerged as an important mediating factor; College students who frequently use digital devices late at night report poor sleep quality, which impacts their mental health. Many respondents also admitted that intensive social media exposure triggers feelings of anxiety, insecurity, and a tendency to compare themselves to others, thus exacerbating the symptoms of mental disorders.

The integration of these results is to reinforce the finding that time management uses technology affects students' mental health through several pathways that directly increase or decrease stress, affect sleep quality, and increase the risk of anxiety due to social pressure in digital media. The study also found that factors such as academic pressure, social support, and self-regulation ability also mediated or moderated the relationship between time management and symptoms of mental disorders(Kabir et al., 2021). Students who have strong social support and good self-regulation skills tend to be better able to manage their time using technology and are more resistant to (Knihs de Camargo et al., 2024).

The results of this study are in line with previous studies that emphasized the importance of time management in maintaining students' mental health in the digital era. However, this study makes a new contribution by emphasizing the specific role of technology use and identifying mediating factors such as sleep quality and digital social pressure(Bolinski et al., 2022). This study also confirms that training-based interventions on the time management of technology use are needed in the campus environment to reduce the risk of mental disorders in students. Recommendations that can be given include the development of technology-based time management training programs, increasing healthy digital literacy, and providing counseling services that are responsive to mental health challenges in the digital era(Ji, 2024).

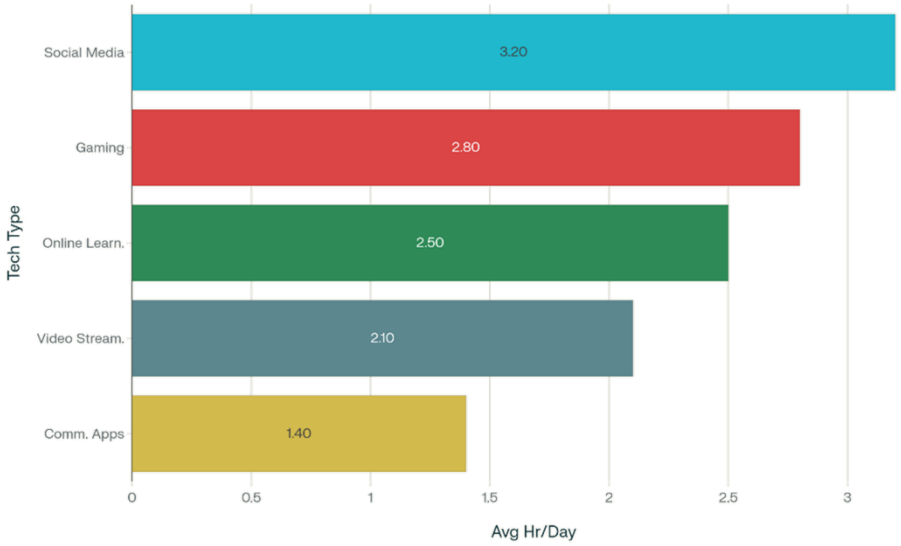


Figure 2. Student Tech Use Patterns

Although 90% of students use online learning apps, the time allocated for digital academic activities (2.5 hours/day) is still lower compared to the use of social media. Gaming ranks second with 2.8 hours per day, while communication apps have the lowest usage yet the highest percentage of users (95% of college students)

Thus, this study emphasizes that the management of time using technology is an important protective factor against the symptoms of mental disorders in students. Its effectiveness is strongly influenced by individual factors such as self-regulation and sleep quality, as well as environmental factors such as social support and academic pressure(Heck et al., 2014). Therefore, developing comprehensive, empirical data-driven interventions is needed to help students adapt to academic and social challenges in the digital age, while maintaining their mental health and well-being optimally(Zughoul et al., 2018).

This study showed that poor time management in the use of technology was significantly correlated with an increase in symptoms of stress, anxiety, and depression, where 68.3% of the variation in symptoms of mental disorders could be explained by the variable of time management of technology use(Roefs et al., 2022a). These findings are deepened through data that states that students with effective time management strategies, such as limiting time using social media and using timer apps, are able to reduce distractions and improve study focus, thereby reducing the risk of stress and anxiety(Hyseni Duraku et al., 2023). In contrast, students who are unable to manage their time using technology tend to get caught up in a cycle of overuse as a form of escape from academic pressure, which actually worsens their mental state.

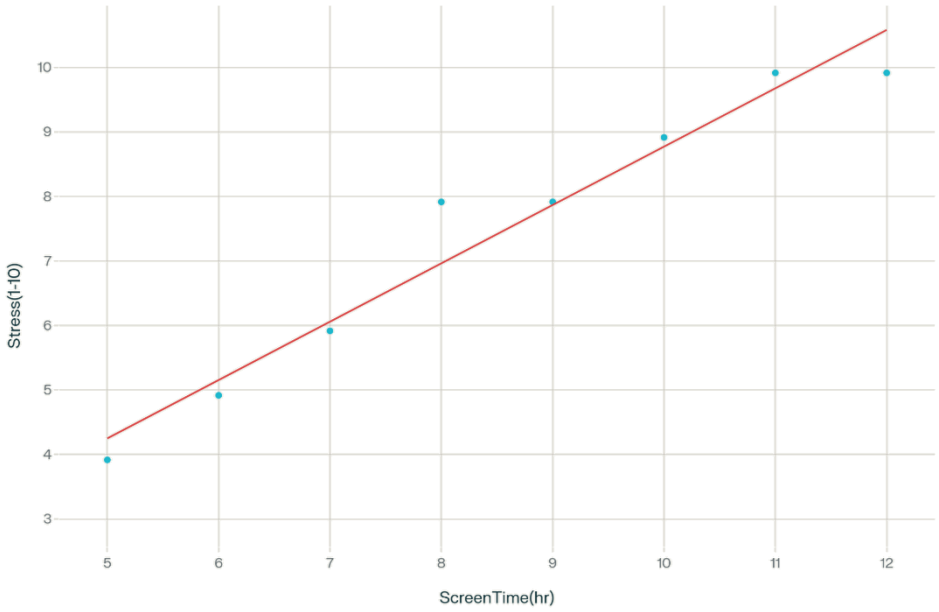


Figure 3. Screen Time vs Stress Level

The scatter plot data showed a clear trend where college students with screen time of 11-12 hours per day reported maximum stress levels (score 9), while those who limited use to 5-6 hours per day showed significantly lower stress levels (score 3-4). The mechanism of the relationship between the management of time to use technology and the symptoms of mental disorders in college students is not only direct, but is also mediated by several important factors. The quality of sleep is one of the main mediators; The use of digital devices late at night has been shown to reduce sleep quality and negatively impact mental health(Song et al., 2024). In addition, digital social stress, such as excessive exposure to social media that triggers feelings of anxiety and a tendency to compare oneself, also increases the risk of mental disorders(Márquez et al., 2016). Self-regulation skills also play a role as a protective factor, where students with good self-regulation are better able to limit the use of technology and manage academic and social pressures(Roefs et al., 2022b).

The integration of these results confirms that effective technology time management can serve as a protective factor against stress, anxiety, and depression among college students(Vincent-Lancrin et al., 2017). However, its effectiveness is strongly influenced by individual factors such as self-regulation and sleep quality, as well as environmental factors such as social support and academic pressure(Misut & Pribilova, 2015). Therefore, comprehensive interventions, such as technology-based time management training, improving healthy digital literacy, and counseling services that are responsive to mental health challenges in the digital era, are needed to help students maintain their mental health and improve their well-being optimally(Choi et al., 2021).

IV. CONCLUSION AND RECOMMENDATIONS

Time management of technology use plays a crucial role in suppressing the symptoms of mental disorders in students, especially stress, anxiety, and depression. This study found that 68.3% of the variation in symptoms of mental disorders in college students can be explained by their ability to manage the time of using digital devices. Students who implement effective time management strategies, such as limiting time on social media and using timer apps, tend to experience reduced distractions, increased study focus, and better sleep quality. Conversely, poor time management in the use of technology contributes to cycles of overuse as an escape from academic pressure, which in turn worsens their mental state. In addition, factors such as sleep quality, digital social pressure, and self-regulation abilities have been shown to mediate and moderate the relationship between time management and symptoms of mental disorders, so the effectiveness of time management is strongly influenced by individual conditions and social environments.

The implications of these findings underscore the importance of developing intervention programs in the campus environment that specifically target improving technology time management skills. The program can be in the form of technology-based time management training, improving healthy digital literacy, and providing counseling services that are responsive to mental health challenges in the digital era. In addition, higher education institutions need to encourage the creation of a supportive social environment, as well as facilitate students to develop self-regulation and maintain sleep quality through integrated policies and education. Thus, comprehensive preventive and promotive efforts are needed to help students adapt to academic and social challenges in the digital era, while maintaining their mental health and well-being optimally.

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