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The Impact of Digital Detox on University Students' Mental Well-being and Academic Performance

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Abstract

The amount of university students' digital technology use today is causing a large issue with digital addiction. Consequently, both health professionals and educators are concerned about the impact of digital addiction on students. The purpose of this study was to investigate the impact of a structured digital detox on undergraduate students' academic performance and psychological wellbeing. A quasi-experimental pretest-posttest control group design was used. One hundred students were randomly assigned to either an experimental group (detox group), n = 50, or a control group, n = 50. Students in the detox group did not have access to any non-essential screen time for two weeks. The detox group was required to attend mindfulness activities and participate in offline study sessions during those two weeks. Three tools were used to measure the variables of psychological well-being, academic motivation, and screen time. The tools were the WarwickEdinburgh Mental Well-being Scale, the Academic Motivation Scale, and student monitored daily screen time logs. Upon completion of the analysis of the data, the results indicated that the detox group demonstrated significant increases in well-being ($t(99) = 4.32$, $p < .001$) and grade point average (GPA) ($t(99) = 3.85$, $p < .001$). No significant differences in either well-being or GPA were found between the two groups. Additionally, a negative relationship existed between screen time and both well-being ($r = -.45$, $p < .01$) and GPA ($r = -.39$, $p < .01$); and a positive relationship existed between well-being and GPA ($r = .42$, $p < .01$). Our multiple regression analyses indicated that decreased screen time and improved concentration explained 31% of the variation in psychological well-being. Overall, our results indicate that intentional digital abstinence can provide the necessary restoration of psychological equilibrium and academic focus for students. Therefore, digital detox can be a viable, cost-effective method of promoting mental resilience and cognitive functioning within the context of higher education.

Keywords: digital detox, mental well-being, academic performance, university students, smartphone use, cognitive load

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Introduction

While today's digitally saturated environment offers many advantages including opportunities for social interaction, information gathering, and entertainment it also presents challenges. There are many students who are dependent upon digital devices for these reasons, but as a result are increasingly distracted from tasks, exhausted emotionally, and overwhelmed. For example, according to an increasing number of studies, heavy usage of cell phones and/or social media can lead to adverse mental health consequences (e.g., increased stress, depression), lower academic engagement, and reduced focus (Elhai et al., 2021; Rozgonjuk et al., 2021) and as such, some students report feelings of restlessness, anxiety, and irritability if they do not use their device(s); symptoms often referred to as signs of behavioral addictions (Rozgonjuk et al., 2021).

Further, the COVID-19 pandemic greatly accelerated the digital saturation of modern education, as remote participation and online learning became more prevalent (Meier & Reinecke, 2021). Although virtual platforms provided an essential means of maintaining continuity while working/studying/socializing, they created further issues of over-stimulation and cognitive exhaustion due to algorithm-driven cycles of content, social comparison, and continuous notifications. In consequence, issues concerning digital wellness i.e., finding the optimal balance between on-line and off-line life have become more prominent within the ongoing dialogue surrounding education (van Velthoven & Powell, 2022).

One of the relatively new strategies to create greater balance in individuals' lives is through digital detox i.e., a voluntarily or planned period of abstaining from nonessential digital activity to restore psychological equilibrium. Digital detoxes have been associated with enhanced productivity, improved moods, and increased levels of mindfulness (Syvertsen & Enli, 2020). While digital detoxes may be beneficial in certain contexts, the effect of digital detoxes have not been empirically studied extensively within academic settings, and to date, very few studies have examined both academic success and mental health simultaneously. Our study addresses this gap in literature by systematically examining the effects of a two-week digital detox among college students.

Theoretical Framework

This study will use two theoretical frameworks related to psychology, which collectively explain the many effects of a digital detox, Self-Determination Theory (Deci & Ryan, 2000) and Cognitive Load Theory (Sweller, 2019), along with information about the effects of attention restoration (Kaplan & Kaplan, 1989).

1. *Self-Determination Theory (SDT)*

Self-Determination Theory states that when people are given the ability to feel autonomous, competent, and connected (related) to others, they can reach their maximum level of potential. Digital

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interactions can prevent students from meeting these psychological needs. For example, students who are constantly seeking digital validation (for instance, likes and comments), may lose some of their sense of autonomy. Students may also experience a loss of relatedness due to the replacement of actual social interactions for superficial digital ones. Additionally, because students are presented with so many digital choices, each providing them with endless comparisons and competitions, students will most likely experience a decrease in their feelings of competence (Ryan & Deci, 2017).

Students who have experienced digital detox regain control of their lives and their minds, allowing them to self-regulate and become focused again without the distraction of digital media. Students who have gone on a digital detox, gain the ability to have selfdetermination, improved mental health, and increased intrinsic motivation to engage in schoolwork.

2. Cognitive Load Theory (CLT)

Cognitive Load Theory states that there is only a finite amount of capacity in the working memory, and that numerous digital stimuli (e.g., notifications, multiple simultaneous tasks, and/or social media feed) utilize the mental resources necessary for learning (Sweller, 2019). As a result of "attention residue," due to the frequency of task switching, focus becomes fractured and fragmented (Leroy, 2009). Reducing digital distractions through digital detoxification reduces the unnecessary cognitive load experienced by the student allowing them to better comprehend academic content and thereby improve retention and comprehension (Paas & Sweller, 2014).

3. Attention Restoration Theory (ART)

Attention Restoration Theory describes how prolonged, intense focus depletes one's mental fatigue, and that such depletion can be restored through participating in restorative activities (Kaplan & Kaplan, 1989). Similarly, the restoration of mental and emotional well-being and attentional restoration occurs during a digital detox when students disconnect themselves from technology and allow themselves to heal emotionally and attentively. After a digital break, students report higher levels of engagement, clarity, and calmness (Johannes et al., 2022).

Figure 1. Theoretical Integration Model

Digital Detox Program

Reduced Digital Overload
(Lower screen time · Fewer notifications · Less multitasking)

Psychological and Cognitive Mechanisms

- **Restored Autonomy** *(Self-Determination Theory)*
- **Reduced Cognitive Load** *(Cognitive Load Theory)*
- **Restored Attention** *(Attention Restoration Theory)*

Enhanced Well-Being and Focus

Improved Academic Outcomes

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Digital detox by figure 1 is a multidimensional integrated intervention which enhances academic performance and wellbeing.

Literature Review

Researchers have been increasingly examining the psychological and educational effects of the rapid development of smartphone and social media use on college students. Studies have shown that excessive digital use has a positive correlation with anxiety, depression, poor sleep, and decreased focus (Montag et al., 2021; Elhai et al., 2021; Sohn et al., 2019).

Reinecke et al. (2017) found that individuals who reduced screen time voluntarily experienced increased autonomy satisfaction and intrinsic motivation compared to individuals who had external limits placed on them. Therefore, voluntary detoxification programs will likely yield longer lasting benefits than mandated limits. Furthermore, Gámez-Guadix et al. (2019) demonstrated that self-regulation training based on mindfulness greatly reduced problematic smartphone use and enhanced emotional regulation.

Du et al. (2022) provided evidence to support the use of mindfulness exercises in detox programs by demonstrating that brief digital mindfulness exercises increased the mood and concentration of university students. These results provide evidence that mindfulness practices should be included in detox programs to enhance attention and selfcontrol.

In addition to reducing stress, digital detoxification also improves overall happiness and contentment in life. One of the first experimental studies that demonstrated that a weeklong smartphone ban resulted in increased well-being and decreased loneliness was conducted by Hinsch and Sheldon (2018). Syvertsen and Enli (2020) also refer to digital detoxification as a form of cultural resistance where individuals can regain authenticity in a world that is overly connected. Qualitative results demonstrated by Syvertsen and Enli (2020) illustrated that participants felt a sense of self-discovery and empowerment after being disconnected from others. Quantitative data illustrating significant improvements in mood, mindfulness, and perceived control postdetox therapy also support these subjective experiences (Tams et al., 2021; Johannes et al., 2022). Collectively, these results indicate that temporary disconnection from electronic devices can lead to significant psychological recovery.

This research also found that the environment in which people undergo detoxification influences the outcome. Peer responsibility and group commitment to detoxification positively influence adherence to detoxification, as stated in research done by Kim et al. (2021); therefore, detoxification therapies conducted via groups will yield greater success than those conducted individually. Detoxification effects are also affected by cultural norms as demonstrated in research done by Chen et al. (2020). In collectivist cultures, where social conformity promotes group interaction, increases in well-being were greater than in individualistic

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settings; thus, the culture and society in which someone lives may also contribute to the success of a digital detox program.

The relationship between technology use and mental health is mediated by sleep quality, as demonstrated in research done by Exelmans & Van den Bulck (2016). When a person uses a smartphone before going to bed, they throw off their circadian rhythms and delay falling asleep, resulting in daytime fatigue and depression. Digital detoxification interventions, such as those studied by Vernon et al. (2018), have been proven to decrease symptoms of insomnia and increase sleep efficiency, thereby increasing emotional stability. The improvements in sleep quality have been shown to contribute to better concentration and productivity in class, providing another possible way to connect detoxification to educational success.

Recent technological advancement has resulted in increased concerns regarding technostress ("digital burnout") resulting from continuous use of digital technologies (Tarafdar et al., 2019). As stated in the research completed by Tams et al. (2021) that a transition to less connectivity will produce long-term positive results to emotional control; however, the short-term increase in stress levels due to smartphone withdrawal during the initial adjustment period to decreased connectivity demonstrates the complexity of digital detoxification; it can be both difficult and positive. Longitudinal research completed by Johannes et al. (2022) found that continued decreases in screen time will produce long-lasting increases in selfregulation and well-being. The longitudinal design of the research clearly shows that temporary detoxification interventions can provide long-lasting behaviors changes.

Another recent concept is "digital minimalism", which was developed by Newport (2019), to support intentional and ethical uses of technology vs. complete elimination of technology. Digital minimalism, like detoxification, aims to find a balance between technology use and personal wellness. With technology being utilized across every aspect of our lives, including higher education environments, finding that balance is becoming increasingly important to university students.

In summary, this body of research demonstrates that even though excessive Internet use has many negative consequences, there is currently a lack of empirical evidence regarding structured detoxification therapies. Only a few prior studies utilize cognitive, motivational, and affective theoretical frameworks, and many rely on short-term self-reported data that do not include measures of academic performance. By using established measures of academic performance, validated psychometric assessments, and a controlled pre-test/post-test design, the current study expands the literature by examining the causal associations between academic performance, well-being, and digital detoxification. This study attempts to provide a comprehensive understanding of how planned disengagement can support longterm digital equilibrium and academic flourishing in university students, by establishing the intervention in wellestablished psychological theories (SDT, CLT, and ART).

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Research Objectives

1. To find out affected mental health of students considering digital detoxification.
2. To find out how digital detox affects GPA and motivation of students.
3. To examine the relationship between screen time and academic performance.

Research Hypotheses

H_1: There is likely to be a relationship between screen time and students' GPA.

H_2: There is likely to be a relationship between screen time and students' wellbeing.
H_3: There is likely to be a relationship among Concentration, GPA and mental health.

Methodology

Research Design

This quasi-experiment is a pre-post test design to explore if a digital detox intervention that is structured (i.e., nonacademic screen use reduction and mindfulness based reflective sessions) will enhance both academic performance and mental health of college students. The quasiexperiment method was selected due to its ability to maintain ecological validity in an academic environment and allow for causal inference by comparing pre-test and post-test data to assess the effects of the intervention. Participants were asked to limit their nonacademic screen time and attend mindfulness based reflective sessions throughout the duration of the 2-week intervention.

The independent variable in this study is participation in the digital detox program; GPA and standardized psychological assessments are the dependent variables assessing academic achievement and mental health, respectively.

To add to the research results by providing insight into how students experienced the digital detox through the lens of qualitative inquiry, a mixed-methods approach was also utilized in addition to the quantitative aspects.

Population and Sampling Strategy

Undergraduate students from public universities mostly study. Whereas stratified sampling strategy was used for 100 sample participants of both genders (18-22 years age), in which 50 were part of control group and 50 were from experimental group.

Inclusion Criteria

1. Undergraduate students were eligible.
2. Students who use smartphones for at least 4 hours a day (excessive screen time was operationally defined by this criteria).
3. Students who frequently use social media.

Exclusion Criteria

1. Students who used digital detox before were excluded.
2. Students who are diagnosed with any disorder.

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3. Inconsistent screen time users were also excluded.

Digital Detox Intervention

The experimental group committed to limiting their non-essential phone and social media use to 60 minutes per day for a twoweek period.

Participants were encouraged to develop selfregulation skills by disabling mobile device notifications, avoiding multi-tasking and tracking their screen time using the mobile apps that come standard on most mobile devices.

Two weekly group meetings were conducted with each participant, led by a counseling psychologist, focused on developing mindfulness, emotional regulation and selfreflection regarding technology use. Each participant was asked to document their thoughts, focus and challenges on a short journal each day during the detoxification period.

To keep the study ecologically valid, participants were allowed to engage in necessary academic activities (i.e., online courses, database searches, access to learning management systems), but not for entertainment purposes.

Self-reporting and anonymous weekly screen time logs were used to monitor compliance.

Instrumentation

Three standardized measures were utilized in the current study:

1. Warwick–Edinburgh Mental Well-being Scale (WEMWBS; Tennant et al., 2007), which is a 14-item assessment of emotional and psychological well-being ($\alpha = .89$ in this study).

2. Smartphone Addiction Scale–Short Version (SAS-SV; Kwon et al., 2013), which is a 10-item assessment of problematic smartphone use, rated on a 6-point Likerttype scale ($\alpha = .86$).

3. Academic Performance Indicator (participants' semester GPA) (verified through university records and reported by participants).

The three standardized scales had acceptable reliability (Cronbach's $\alpha > .80$). Additionally, a brief survey of demographic information was administered to all participants.

Moreover, students' screen time was also measured by using built-in smartphone analytics present in settings of each phone. Participants were asked to submit screenshots of their weekly log ins.

Procedure

The data collection occurred over a fourweek period. At first the participants who met inclusion criteria and fulfilled eligibility protocols were identified by sending screening questionnaire via email. Through which randomly desired participants were selected in experimental and control group. After these initial assessments were made and afterwards experimental group started detox program. In proceeding weeks, screen time of participants and their program compliance

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were recorded and ensured. In last 4th week final reports were checked.

Informed Consent

Consent was received from participants, only those participants who show willingness

Table 1

were added. Students were also informed about the study purpose, confidentiality and expectations.

Data Analysis

SPSS was used to analyze the results.

Results

Descriptive Statistics

This part of study represents assessment results, tests run and their results.

Descriptive Statistics for Major Variables (N = 100)

Variable	**Group**	***M* (Pre)**	***SD* (Pre)**	***M* (Post)**	***SD* (Post)**
Screen Time (hrs/day)	Experimental	6.1	1.2	3.3	1.0
	Control	6.0	1.3	5.8	1.2
Mental Well-being (WEMWBS)	Experimental	43.2	8.1	54.8	7.9
	Control	44.0	7.6	45.3	7.2
GPA	Experimental	3.11	0.32	3.35	0.30
	Control	3.10	0.33	3.13	0.34

Note. M=mean, SD=standard deviation

According to the descriptive results experimental group showed visible decrease in screentime usage from 6.1 to 3.3 hours with increased scores on mental well-being scale and GPA. Whereas control groups showed unnoticeable change in any descriptive statistical analysis.

Table 2

Correlation between mental well-being and screen time among Students.

Variable	***1***	***2***	***3***	***4***
Screen time	—			

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Well-being	–.45**	—		
Concentration	–.41**	.47**	—	
GPA	–.39**	.42**	.36**	—

Note. $p < .01$.

have lower wellbeing, GPA and Results showed significant relationship concentration towards studies. among variables. Screen time showed significant negative correlation with mental

In contrast, wellbeing results showed wellbeing r= –.45, **p < .01**, concentration, r= significant positive correlation with both –.41, **p < .01**, and GPA, r= –.39, **p < .01**, concentration, r= .47, **p < .01**, and GPA, r(= indicating that students who spent more time

.42, **p < .01**, indicating that students who on mobile phones and increase screen times

have higher wellbeing gain greater concentration and GPA.

Table 3

T-Test Results of Groups

Variable	**Group**	***t***	***df***	***p***
Screen Time	Experimental	–12.84	49	< .001
Mental Well-being	Experimental	8.76	49	< .001
GPA	Experimental	3.45	49	.001
Screen Time	Control	–1.12	49	.27
Mental Well-being	Control	1.13	49	.26

Note. p = probability value.

detox mental wellbeing of students was According to the results significant improved. In case of experimental group, it improvement was administered. As after

was indicated that screen time was reduced

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between pre-post intervention $t(49) = -12.84$, **$p < .001$**. In result, mental wellbeing was also increased in post test results for experimental group.

Table 4

Regression analysis between screen time and well being

Predictor	***B***	***SE B***	***β***	***t***	***p***
Constant	2.47	.19	—	12.93	< .001
Wellbeing (Post)	.018	.007	.32	2.67	.009
Screen Time Reduction	.045	.016	.29	2.88	.005

Note. $p < .01$.

According to the results regression was significant as screen time and detox predicts variance in students GPA. As screen time reduction was a significant positive predictor of GPA and mental wellbeing of students $B = .045$, $SE = .016$, $\beta = .29$, $t(97) = 2.88$, **$p = .005$**.

Discussion

Through the lens of SDT, when individuals satisfy their basic psychological needs for autonomy, relatedness, and competence, human well-being is enhanced. Students in today's digital environments frequently experience loss of autonomy because of the constant monitoring of their activity, constant flow of notifications, and pressure to remain connected to others via social media. The digital detox program intentionally allowed students to take control of their own attention, thus fostering self-determination and internal motivation. By the second week, many students reported experiencing a decrease in feelings of discomfort or boredom withdrawal and instead reported being calmer, more focused and having greater control of their schedules.

Hypothesis predicted that experimental groups would show reduced level of anxiety and improved mental wellbeing after detox session and results were also supported where control groups showed no change or improvement while experimental group concentration and GPA were improved. From a cognitive perspective, CLT also suggests that students can focus and encode and retrieve information more effectively when digital distractions are removed and placed on hold. Digital distractions, including excessive multitasking, message alerts, and divided attention create excessive cognitive loads for students. Thus, the temporary elimination of these digital distractions resulted in reduced excessive cognitive loads that were negatively influencing students' abilities to learn and solve problems. Although small in magnitude, the increase in students' GPAs indicated the cognitive benefits associated with eliminating digital distractions. Improved sleep can lead to improved mood and concentration; therefore, improved sleep can enhance the ability of students to engage with their academic material. On the other hand, social media has been shown to

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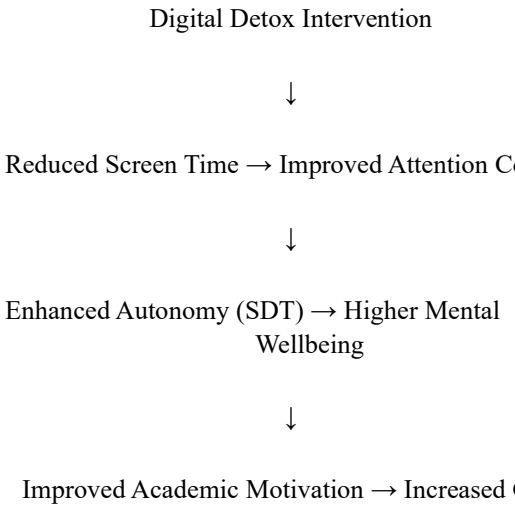
negatively affect both circadian rhythms and memory formation (Harbard et al., 2021).

Social and environmental factors may also play a role in the success of this intervention. The fact that the reflection sessions were conducted in a group setting provided a social support system for individuals to justify abstaining from using social media, something that could have potentially seemed like an individualistic activity if it had been done alone. To preserve digital detoxification as a collective action of authenticity, Syvertsen and Enli (2020) assert that social resistance to digital media is required. The same was reported in prior research on digital detoxification in the workplace. Tams, Legoux, and Limbu (2021) reported that turning off a smartphone initially creates more stress than usual, but ultimately, reduces chronic tension and improves focus at work. These two phases are like the path that the participants of the current study took through the stages of withdrawal-recovery.

Figure 2. Conceptual Flowchart of Digital Detox Effects



Limitations

Despite many contributions, this study has several limitations. First, the sample consisted of students from a single University; therefore, findings are likely limited to specific types of educational environments or cultures. Elite institution students may have different digital behaviors, academic pressures, and/or constraints than students attending Community Colleges, International Universities, etc. Future studies need to repeat the intervention in multiple settings using larger samples.

Second, although an RCT would provide better internal validity through random assignment of participants to treatment groups and control groups, the quasiexperimental design used here was designed to allow practical application of the interventions. In other words, some of the effect observed in the study may be due to unmeasured confounding variables such as prior motivation or prior time management behavior.

Third, the use of self-report measures of screen time may introduce a potential source of bias since the reports were based upon participant self-reports. Although smartphone analytic methods were employed to validate self-report logs, reliability could be improved by employing more objective methods of measurement (e.g., continuous digital tracking or mobile phone app-based measurement). Lastly, the study focused primarily on short-term outcomes. It is unclear whether the cognitive and psychological benefits of digital detoxification persist beyond the duration of

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the intervention. Follow-up studies of students conducted over several months could assess whether students acquire longterm self-regulatory skills because of their participation in a digital detox program or if they tend to revert to previous heavy usage patterns.

Practical and Policy Implications

Public Health agencies can utilize digital detox frameworks to address the growing concern of youth mental health on a population-wide basis. As organizations and educational institutions increasingly adopt hybrid or fully digital formats, maintaining psychological equilibrium will become an even greater necessity.

Future Directions

The next studies should extend our findings in the following ways:

1. Longitudinal RCTs will provide evidence for the enduring nature of these effects.

2. Cross-culture studies are needed to evaluate whether the social organizations and cultures within different countries and/or regions affect how individuals engage with technology.

3. Studies investigating mechanisms (e.g., executive control, emotional regulation, sleep) would help us understand why these positive outcomes were observed.

4. Technology-based detoxification (i.e., using wearables and/or "focus" apps to monitor and encourage self-regulation) is another area of investigation.

5. The sample needs to be expanded to include older adolescents/young adults and/or working adults to determine whether the benefits we observed are generalizable to other populations.

Conclusion

Study provides empirical evidence that digital detox is very important and beneficial for today's youth and students to perform better in life including GPA and mental wellbeing. Students who controlled their digital intake performed better in scores and academic performance overall.

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